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MESA VERDE WATERLINE REPLACEMENT PROJECT PHASE III ARCHEOLOGICAL AND HISTORICAL STUDIES

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Division of Research and Resource Management • Mesa Verde National Park • Colorado

Dedication

This report is dedicated to the memory of Jack O'Neale, Denver Service Center Chief Inspector of the Mesa Verde Waterline Replacement Project, Phase III. It was a pleasure to work with one of the finest and the best.

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Abstract

The Mesa Verde Waterline Replacement Project Phase III, 1992-1997, provided an opportunity to investigate human land use and settlement patterns through time in the Colorado Plateau region of southwest Colorado. A total of 43 ha was surveyed for cultural resources along the 63 km route of the waterline across three different ecological zones: lower montane foothill, river valley floor, and mesa top. A total of 47 sites was discovered during the construction of the waterline replacement and effects of construction work were mitigated on 30 sites by testing and excavation. Overall the cultural resources discovered ranged in time from the late Archaic Period (ca. 1000 B.C.-300 B.C.) through the Anasazi occupation (A.D. 1-1300) through the Euro-American historic period (A.D. 1600-1950). The sites reflected a wide range of land use including small campsite fire pits, pottery firing kilns, mountain resource procurement sites, prehistoric horticultural habitation sites, historic homesteads, camps, trails, historic railroads, and federal park development

One of the most significant contributions to our understanding of the past was through the excavation and analysis of nine Anasazi pottery firing kilns at seven sites on Chapin Mesa within Mesa Verde National Park. The kilns were among the first Pueblo II trench kilns excavated in the Mesa Verde Region. The stratigraphic deposits indicated a four stage firing process for Anasazi pottery and the fuel used in the firing was identified as primarily pinyon and juniper.

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CHAPTER 1
INTRODUCTION AND ARCHEOLOGICAL RESEARCH DESIGN

This report contains results of the archeological and historical studies required to mitigate adverse effects on the cultural and natural resources encountered during the construction of Phase III of the Mesa Verde Waterline Replacement Project. In all, 43 ha were surveyed and 63 km of pipeline construction were monitored. Forty-seven new sites were found during the construction phase of the project and 30 sites were excavated or tested.

The goal of the research was to document and describe the prehistoric and historic human occupational evidence within the Project area and, where possible, to describe in detail the site formation processes associated with individual sites. Numerous archeological discoveries were expected because of the geographical location of the Project in Montezuma County, southwestern Colorado where the site density is high. Federal laws required that adverse effects to natural and cultural resources be moderated or alleviated by these investigations.

Work on all phases of Mesa Verde National Park's Waterline Replacement Project complied with federal statutes for protection of cultural and natural resources. These statutes include: Antiquities Act of 1906, National Historic Preservation Act of 1966, Archeological Resources Protection Act of 1979, and the National Environmental Protection Act. Human remains were treated in accordance with the 1990 Native American Graves Protection and Repatriation Act (NAGPRA) guidelines and the "Memorandum of Understanding Regarding Native American Human Remains and Associated Artifacts Encountered as a Result of Pipeline Construction," signed by Mesa Verde National Park administrators in June 1992. Bureau of Land Management (BLM) policies and responsibilities regarding the discovery of human remains are specified in the Memorandum of Understanding signed by Mesa Verde National Park and the BLM for this project in 1992.

Project Study Area

The major portion of Mesa Verde Waterline Replacement Project area consisted of a 12 m (40 ft) wide linear transect which extended for approximately 63 km (39 mi) across the southeastern section of Montezuma County, Colorado (Figure 1.1). The transect followed the route of the West Mancos Water Supply System of the Mesa Verde National Park Water System. The West Mancos Water Supply Line begins at 2524 m (8,280 ft) elevation in the lower montane region of the La Plata Mountains, follows a route southwesterly across the Mancos Valley, over the divide and into the Montezuma Valley. The line continues up to 2462 m (8,076 ft) on the north escarpment of the Mesa Verde cuesta, and then drops 305 m (1,000 ft) to eventually provide water for the delivery system to the lower end of both Chapin and Wetherill Mesas.

The study area included a transect across three different ecological zones: the lower montane foothill, the river valley floor, and the mesa top. Both the prehistoric and historic populations utilized these different zones in the manner best suited to their subsistence needs. These needs were part of larger social and cultural interaction spheres. The archeological remains left behind by these various groups allow us to glimpse the land utilization schemes and resource exploitation practiced through time by the people of the Mesa Verde area.

Culture History

The human occupation of the study area fits not only within a geographical framework but also within the chronological and cultural framework of what archeologists call the culture history of North America (Figure 1.2). Archeologists identify and characterize two major time periods: Prehistoric and Historic. The North American Prehistoric, before written records, is further divided by the criteria of time and material culture into Paleoindian, Archaic, and Formative Traditions. In southwest Colorado the Formative is archeologically known as Anasazi or Ancestral Pueblo. The Historic Context primarily follows that established for the Colorado Plateau (Husband 1984) and is discussed in more detail in a separate chapter.

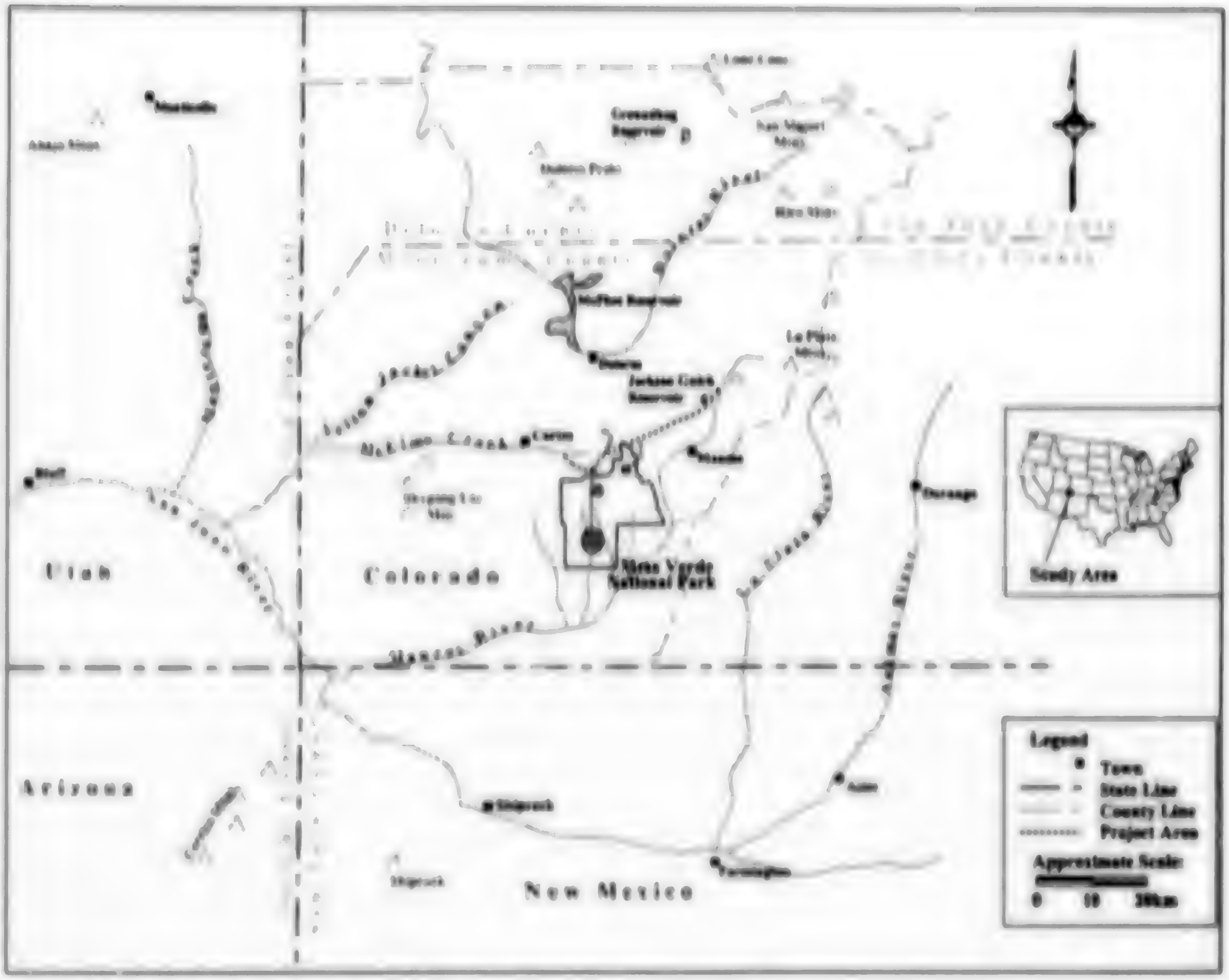


Figure 1.1. Mesa Verde Waterline Replacement project area.

Paleoindian Tradition

The Paleoindian Tradition began in North America at or near the end of the Pleistocene (Ice Age), perhaps 18,000 to 20,000 years ago just before the great glacial ice sheets retreated from the lower portions of the continent for the last time. Archeological evidence of the tradition indicates a lifeway based mainly on hunting large herds of herbivores (Pleistocene megafauna) as well as collecting wild edible flora. This nomadic hunting and gathering lifeway was present in Colorado from 9,000 B.C. to about 5,000 B.C. (Cassells 1983).

In the southwestern corner of Colorado, evidence suggesting the presence of these nomadic hunting bands is extremely sparse, consisting solely of isolated finds of projectile points characteristic of the Paleoindian Tradition. A single Clovis site, located to the west of the study area in southeastern Utah, is the only actual campsite dating to this time period in the immediate area (Davis 1994).

By 5000 B.C., the large megafauna, including species of mammoth and bison, which had sustained this lifeway were virtually extinct. This extinction probably resulted from a combination of factors including loss of habitat from climatic change and intensive hunting by the growing human population. Coincident with the change in resources, the material culture changed to indicate the end of the Paleoindian Tradition.

Archaic Tradition

The Archaic Tradition (5000 B.C.- ca. 300 B.C.) is characterized by artifacts which reflect a change in subsistence strategies. There appear in the archeological record, an increasing number of grinding tools, such as manos and metates, which suggest a greater reliance on processing plant food. Recovered bone assemblages suggest the addition of many small game species. Based upon the number of known sites, the population seems to have steadily increased.

By 3000 B.C., bands of Archaic peoples were present along the Western Slope of the Rocky Mountains. By this time, there is growing evidence that semipermanent houses were being constructed for the winter months. The atlatl, a spear throwing device, replaced the hand held thrusting spear. Smaller, notched projectile points replace the long, smooth, stemmed points of the late Paleoindian Tradition. Basketry and fiber cordage are important in the material culture inventory. All of these traits indicated a greater reliance on the gathering and processing of wild plants and less reliance on the hunting of big game.

The presence of archeologically recognizable houses increases from the early Archaic to the late. These houses were generally basin shaped, circular or oval in plan view, with a wattle and daub superstructure. Interior floors included a hearth, storage pits of various sizes, and peripheral post holes which indicate an enclosing wall was present. In the immediate area of Mesa Verde, excavations in the Navajo Reservoir District of northwest New Mexico revealed numerous basin shaped Archaic houses (Steve Fuller, personal communication 1990).

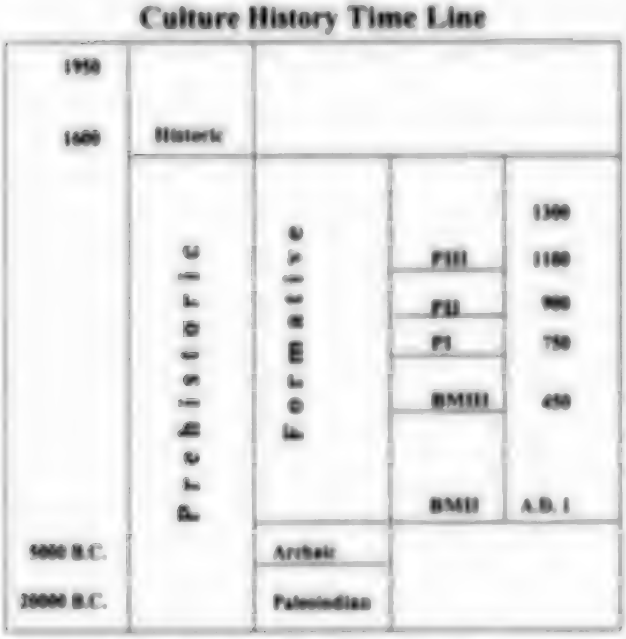


Figure 1.2. Culture History time periods.

Formative Tradition: Anasazi

Throughout the North American continent the Formative Tradition is recognized by a radical change in subsistence strategies. People started farming domesticated crops such as corn, beans, and squash in contrast to their previous lifeway of obtaining plant food only by gathering wild resources. In southwest Colorado the Anasazi Archeological Tradition is the local manifestation of the Formative. The Anasazi Tradition in the Mesa Verde area is divided into five periods of culture history from A.D. 1-1300: Basketmaker II, Basketmaker III, Pueblo I, Pueblo II, and Pueblo III (Eddy et al. 1984).

Basketmaker II Period (ca. A.D. 1-450)

The people of the early Basketmaker II and the late Archaic appear to have been the same human population in a continuum of occupation of the area. Instead of the emergence of a totally new group, the same population was making a shift in subsistence practices to an even greater reliance on plants. By about 300 B.C., corn agriculture was in its infancy, and some crudely fired brown ware pottery was being made in the Four Corners Region.

Archeologically, Basketmaker II (A.D. 1-450) is recognized by the advent of more substantial dwellings and an increasing reliance on corn and squash horticulture. Foraging for wild plants and hunting for wild game never stopped, but there was a trend toward settling down for a certain portion of the year to plant and harvest crops. The habitation sites of these people are found in both open and cave locations. The greatest concentration of Basketmaker II sites in the Four Corners Region is found in the dry caves of northeastern Arizona and southeastern Utah.

In the Project area, the preponderance of natural caves and their long term use by later peoples suggests that beneath some of the Mesa Verde cliff dwellings Basketmaker II remains may be found. Isolated atlatl points in the style of Basketmaker II have been found. However, there are no Basketmaker II habitation sites recorded within the Project area nor within the confines of Mesa Verde National Park. This may mean that archeological surveyors did not recognize the sites, or it may actually reflect the settlement pattern at the time.

Basketmaker III Period (A.D. 450-750)

By A.D. 450, people had settled into permanent small habitations and started raising beans along with corn and squash. Small game, wild plants, and some large game (bighorn sheep, deer, elk, bear, and antelope) have also been identified in the archeological record. This Basketmaker III Period, from A.D. 450 to A.D. 750, can be distinguished from the preceding period by the introduction of three new cultural traits: the use of the bow and arrow, the cultivation of beans, and the production of well-made gray and white ware pottery. All of these innovations imply a more settled and sedentary lifeway.

The architectural pattern also changed in the Basketmaker III Period. In previous times, the houses were simply basin shaped depressions covered over with mud and sticks. The Basketmaker III people, however, constructed bilobed pithouses as deep as 1 m. The pithouses contained a wide shelf (generally called a bench or banquette) around the forward section of the main room, and this same bench was sometimes found in the antechamber as well. The antechamber was an annex to the main chamber, usually found at the south end of the structure, and was connected to the larger main chamber by a short passageway. Entry into the house was by a ladder through the roof. Archeologists find evidence of domestic activities in the main chamber and of storage in the antechamber.

In the area to the west and north of the pithouse, small noncontiguous surface rooms of jacal construction were built for storage. These small rooms were almost never used as habitations. The permanency of these pithouses and the plethora of storage facilities paint a picture of a sedentary farming people. Their tool inventory as well as the faunal and macrobotanical remains show that they still exploited their natural domain, but farming was the mainstay of their existence. Throughout the Basketmaker III period this relatively new lifeway developed and was refined, and the population began to grow. Within the immediate Project area, there are numerous Basketmaker III habitation sites both on the mesa top and on the valley floor.

Pueblo I Period (A.D. 750-900)

By A.D. 750, the Anasazi had refined their society and changed enough of their traits that archeologists now call them the Pueblo I (Brisbin and Varien 1982). The main changes that characterized this period were in ceramics and architecture. Previously the jars were smooth with fairly long necks, which are referred to as Chapin Gray. Around A.D. 750, the necks became shorter and wider, and the coils around the neck were not smoothed away. This new neck-banded pottery type is referred to as Moccasin Gray and it is the prototype for the corrugated ware of the following period. Another addition to the pottery inventory was an imported red ware, which was manufactured in southeastern Utah. Abajo Red-on-orange is the first red ware to appear in the Mesa Verde region around A.D. 725, indicating that trade was beginning to flourish.

Architecturally there were many changes. The shallow bilobed pithouse had been replaced by a deep (2 m is common), squarish structure with a true ventilator shaft complex. Through time, as the main chamber had increased in depth, the antechamber decreased in size until its only function was to supply fresh air. Pueblo I multiple household villages with contiguous above ground living and storage rooms developed from the noncontiguous jacal surface rooms of the small, one- and two-family homesteads of Basketmaker III. Each Pueblo I village consisted of an arc of rooms with the pithouses located in the plaza area to the south. The settlement pattern of the Late Pueblo I Anasazi can be characterized by the aggregation of the population into large multiple household villages.

Pueblo II Period (A.D. 900-1100)

Around A.D. 890 a climatic change to cooler, drier conditions seems to have been the cause of a shift in the Anasazi settlement pattern (Peterson 1984). The once aggregated populations of the Late Pueblo I dispersed over much wider areas to seek out those ecological niches where their form of subsistence could still be practiced. By A.D. 900, the beginning of the Pueblo II Period, the Anasazi settlement pattern was characterized by small hamlets (Prudden Unit Type Pueblos).

Architecturally, the Pueblo II Period (A.D. 900-1100) is identified by true horizontally coursed masonry.

Most of the walls of the surface room block consisted of stone masonry, although an occasional partition wall was still being constructed of jacal. The curvilinear aspect of the room block so characteristic of Pueblo I changed to a rectilinear form in Pueblo II. Perhaps the most important change was that the domestic pithouse located in the plaza had evolved into what archeologists call a kiva in which the primary activities were of a ritual nature. The late Pueblo II kiva was fully lined with masonry with a southern recess and wall niches.

Pottery manufacture improved markedly at this time. The gray ware body of unfired vessels was slipped with a white firing clay so that the black designs appeared on a pearly white background after firing. The large, culinary gray ware jars became fully corrugated. This means that none of the coils were obliterated during construction; rather they were carefully pinched together, creating an indented pattern.

Pueblo III Period (A.D. 1100-1300)

By the beginning of the Pueblo III period, masonry wall construction had become a fine art. Circular, multistoried towers were common both within the habitation sites and at isolated or seemingly isolated mesa tops or canyon bottoms. These towers were usually directly related to one or more kivas in a tower-kiva complex. The habitation sites quite often had more than one story, particularly the larger villages.

Throughout the Four Corners Region, pottery types by this time had become very regionally distinct in design, layout, and form. For instance, a Tusayan Polychrome bowl from the Kayenta Region could not possibly be mistaken for a Mesa Verde Black-on-white. The mug form was developed in the Mesa Verde Region and was made nowhere else, just as the cylindrical jar was only manufactured in the Chaco Region.

Trade networks by this time were well established, both interregional and intraregional. These networks reached as far south as Mesoamerica and as far west as the Gulf of California. The Anasazi culture flourished during this period, probably reaching its peak around A.D. 1200. Then, the entire dynamic process was brought to a halt. The aggregation of an expanding population brought unredeemable pressure against an already overtaxed environment, and a succession of droughts occurred. Tree-ring studies indicated that around A.D. 1160 a drought began and lasted for 30 years and then drought hit again between A.D. 1276 and 1299.

These two periods of severe drought, coupled with the depletion of natural resources, left the Anasazi no other alternative but to abandon the entire northern San Juan Region. Tree-ring dates suggest that this abandonment was a gradual process rather than mass migration. The Mesa Verdeans probably moved to the south and east, eventually settling along the Rio Grande River of New Mexico, where pueblos exist today. People of the Kayenta Region (west of Mesa Verde) seem to have moved south into northeastern Arizona. These people were probably the ancestral Hopi. By the close of the thirteenth century, the area encompassing the southwestern corner of Colorado appears to have been void of human occupation (Eddy et al. 1984).

Historic

From A.D. 1300 when the Anasazi left until the early nineteenth century with historic Euro-American exploration and homesteading, there is no strong evidence to indicate that southwestern Colorado was consistently occupied by any group of people. By the early part of the seventeenth century, Spanish chronicles refer to different groups or bands of Utes that were encountered in what is now southwestern Colorado (Husband 1984). These sporadic encounters were usually in or near the San Juan Mountains. The Utes practiced a lifeway of hunting and gathering in the manner of the Archaic Tradition, moving within a large area to procure the natural resources available. The Ute's lifeway was based on a seasonal round. In the warmer parts of the year they were found in the mountainous regions and, as fall approached, they began to move downward to sheltered valleys. By early winter they were in their winter camps along major drainages. Although they did not settle or occupy any place permanently, individual bands were known to utilize specific territories and considered those areas as theirs.

The Navajos (*Dineh*) and Utes (*Nooche*) traditionally had a similar lifeway except the Navajo had adopted corn agriculture by the beginning of the seventeenth century. As of today, the earliest generally accepted dates for the Navajo presence in the San Juan Basin are in the early 1600s (Schaafsma 1979). The Dineh, due to their exposure to the Pueblos and the Spanish of New Mexico, quickly adopted a pastoral lifeway. Prior to the nineteenth century archeological evidence indicates the Utes and the Navajos utilized the study area portion of southwestern Colorado for intermittent hunting or gathering.

Because of the Ute presence, particularly after the Spanish introduction of the horse, the Navajo never gained a foothold in this part of Colorado. The Navajo ancestral range has always been south of the San Juan River (Hogan et al. 1991; Eddy et al. 1984).

Research Design

The research design for this project was formulated in a flexible manner to better accommodate the variety of site types expected along the 12 m (40 ft) wide construction corridor through the environmental diversity of three major ecological zones. Site types could be expected to range from single isolated features of unknown cultural affiliation to entire habitation sites which could possibly represent any human occupation from the Paleoindian Tradition to the Historic. In general, the design focused upon obtaining information on the prehistoric and historic occupation and use of natural resources under the categories of economy and adaptation and social organization.

Economy and Adaptation

Research questions involving economy and adaptation were an important part of the research design. A general goal was to try to understand the relationship between human society and the natural environment. This study was designed to focus on subsistence strategies employed by various groups through time and how they may have changed. Although the width of the construction right-of-way would limit research, the length of the project transect across three ecological zones of mountain foothill, valley floor, and mesa top would allow for developing a comparative environmental data base. Questions of comparative resource exploitation could be addressed using surface artifact types and distribution. The archeological evidence could answer the questions of what people were doing to make a living, their economy, and how they changed through time to meet the challenges of the environmental resources, their adaptation.

Social Organization

Research questions involving social organization could conceivably be addressed if enough of a site needed to be excavated to provide an adequate data base. Most discoveries made along the narrow right-of-way could be expected to be single features either isolated from main habitation areas or associated with features outside the area of mitigation requirements. Because of the lack of architectural relationships, few if any questions pertaining to social organization could be addressed by such small isolated sites and portions of sites.

If, however, an entire site needed to be excavated it was proposed that all major architectural units would be excavated and the midden area tested. These data would provide information on the social organization of the human population.

Site Formation Processes

Research questions of site formation processes could also be addressed if a site, or major feature, were excavated during the Mesa Verde Waterline Replacement Project Phase III. Site formation processes are those agents, both cultural and natural, which produce the archeological record (Schiffer 1987). The processes through which sites are formed can be grouped into three categories: preabandonment (occupational), abandonment, and postabandonment. This simplified sequence emphasizes that at different periods in a site history, different processes dominate. The research design emphasizes understanding the prehistoric and historic preabandonment occupation of structures and floors as well as occupational areas peripheral to the main human activities.

Site Typology

Within the research design which seeks to answer questions of economy and adaptation and social organization, and one in which numerous archeological discoveries were expected, a system of site classification based on formal attributes would be necessary to describe settlement patterns and implement sampling strategies. The cultural resources commonly known to be found in this geographical area encompass a long time span, ranging from the Late Archaic Period to the historic era. The primary prehistoric period represented by the sites in the area is Formative Anasazi or Ancestral Pueblo.

The site typology developed during the 1978-1983 Dolores Archeological Program promised to best approximate the site types encountered along the waterline corridor and will be used with some modifications in this report (Kane 1983: 19-23). The Dolores Archeological Program and the Mesa Verde Waterline Replacement Project both are located within the Northern San Juan Archeological Region and are separated spatially by less than 20 km. A definition of each of the site types utilized in the remainder of this report is given below.

The site categories included are Limited Activity Locus, Seasonal Locus or Use Area, Habitation (Base Camp, Hamlet, Large Hamlet, Village, historic homestead), and Isolated Find.

Limited Activity Locus

The Limited Activity Locus type of site was used for only a short time (from an hour up to a few days), and the use was often limited to a single economic season (hunting season, growing season, etc.). The activity or activities carried out at the site were probably performed by one or a few individuals. The key to this site type is that the activities were limited and the occupation transitory in nature. Site types under this heading include quarries, kill sites, gathering stations, and signal fires. Individual sites of this type may be difficult or impossible to date because they usually lack temporally diagnostic artifacts or features.

Seasonal Locus or Use Area

The Seasonal Locus or Use Area includes sites which were occupied on a short term basis, usually by small social or economic groups. The occupation of these sites was typically seasonal and periodic in nature. The span of occupation at seasonal areas ranged from a few days to several weeks, possibly as long as a month or two. These sites were often utilized on a periodic schedule, such as three times a year. Sites that fall into this category include roads and trails, procurement/processing camps, horticulture camps or field houses, pottery firing kilns, historic tent frames, and reservoirs. By definition, isolated kivas, great kivas, and towers would be seasonal loci or use areas.

Habitation

Habitations are archeological sites where a wide range of activities were performed. These sites were occupied continuously or for a major portion of the year. An historic habitation is often called a homestead. A prehistoric habitation consists of one or more household clusters in a centralized location. Substantial architectural remains such as rooms, pitstructures, and outside work areas are usually present. Habitations represent the locations where most community activities took place, and they represent the home base of the community. The habitation category can be divided into four subgroups, based on architecture, number of social units, and function. The subgroups are:

1) Base Camp

A Base Camp is a site occupied by one or more households groups for many purposes and may have served as a central location for endemic and outlying activities. Establishing this category allows for the study of Archaic sites as well as Anasazi types. Substantial domestic architecture is absent, although smaller facilities and features such as hearths, ramadas, or brush screens usually accompany the sites.

2) Hamlet

A hamlet is a small habitation containing one to three household clusters (15 to 45 individuals). A special case in this category is the unit hamlet, which contains one household cluster. Hamlets contain permanent domestic architecture, such as room blocks and/or pitstructures. Hamlets are the central abode of small communities or neighborhoods.

3) Large Hamlet

A Large Hamlet is a permanent habitation incorporating several household clusters (usually four to eight). In Anasazi sites, a potentially important discriminator is the presence of an intracommunity integrative structure such as a "Big Pithouse" or kiva. Several of these dating to the Pueblo I period were recognized on the Dolores Archeological Program (Brisbin et al. 1984; Kuckleman 1984).

4) Village

The village is a permanent habitation incorporating many household clusters (usually more than eight). Intracommunity and intercommunity integrative structures such a "Big Pithouses" or kivas and great kivas are often present. The village incorporates many architectural units such as pitstructures and large room blocks. The architecture may be arranged in an orderly manner according to a preconceived plan.

Isolated Find

The Isolated Find category is used in this report to indicate the occurrence of either natural or cultural phenomenon without obvious patterning. As part of the research design, guidelines were established for defining a formal occupation site (Chomko 1992: 1-2). When there were five or fewer artifacts in a location and no associated evidence for 20 m surrounding, the occurence was categorized as an Isolated Find.

Investigative Strategies

Archeological Survey

Archeological survey for cultural resources included a 33 m (100 ft) wide area on either side of the right-of-way centerline. A total of 66 m (200 ft) was inventoried. The intensive survey was performed by walking intersecting, zigzag transects. A maximum distance of 10 m between transects was maintained at all times. Special attention was given to the examination of arroyo and wash cut banks for buried sites or features.

When cultural materials were observed on the ground surface the individual items were pin-flagged and the survey transects were reduced to attempt to locate additional cultural items, and to determine whether said artifacts were isolated finds or members of a site assemblage.

When a site was encountered personnel inspected the area to determine site boundaries, all structural remains, features, depressions, middens, ash/charcoal stains. Artifacts were identified with particular attention to those that were diagnostic. Once the extent of the surface distribution of a site was determined, site mapping, establishing a site datum and recording the composition of the surface site attributes and artifact assemblage was undertaken. Transit maps of all surface features and the limits of the artifact distribution were completed. These maps also depicted pertinent topographic features within site boundaries and the construction right-of-way or construction feature. Diagnostic artifacts were sketched or photographed.

Each site was plotted on the appropriate USGS 7.5' quadrangle map. Colorado State Site Forms (Prehistoric and Historic) were completed in the field. Universal Transverse Mercator coordinates (UTM), location/access, and distance to permanent water, were determined in the laboratory. Site photographs were taken in black/white print using (400 Tri X Pan and 125 Plus X), and color print (Kodacolor 100/200) and logged on a field photography form. Several sites were chosen for various slide presentations on the project using color slides (Kodachrome 200).

Artifact field analysis was conducted when a site was encountered. No artifacts were collected from the reconnaissance surveys for the construction undertakings. All artifact classes were described, material and quantity were logged on sites with fewer than 100 artifacts. On sites with artifact assemblages greater than 100 artifacts, multiple sample quadrats were placed in areas of concentration (such as the midden), within the structures and the surrounding areas. Each sample quadrat measured 4-x-4 m. All artifacts were analyzed within the quadrat in the field and logged.

Survey collection strategies employed on the Waterline Project varied. Total avoidance of archeological sites was the first priority by means of rerouting the construction undertaking if possible. If a site was encountered within, or adjacent to the construction undertaking, the site boundary was flagged, all artifacts mapped, and all artifacts were collected within the construction right-of-way that would be disturbed. No other artifacts were taken from the site.

All original forms, maps, photographs, documents and artifacts involving work conducted on Bureau of Land Management lands are curated at the Anasazi Heritage Center, Dolores, Colorado. All documents, reports, forms, photographs, and artifacts collected within the Park boundary are curated at the Mesa Verde Research Center.

Numerous isolated finds (IF) were encountered and recorded on the Mesa Verde Waterline Replacement

Project. Each isolated find was described and recorded on a Colorado State Isolated Find Form. A sketch of the artifact was included. Each IF was plotted on the appropriate U.S.G.S. 7.5' quadrangle map. All information was filled out in the field with the exception of the Universal Transverse Mercator coordinates and nearest water sources, which were determined in the laboratory. If the isolated find was threatened by construction activities then it was collected, if not threatened it was left in place.

During the archeological survey of the pipeline corridor, Waterline archeologists observed paleontological resources primarily on BLM lands, some on private lands. These resources were recorded on the Colorado State Paleontological Forms. These samples were identified by Dr. Mary Griffiths, Mesa Verde National Park's Geologist and Invertebrate Paleontologist, using the Mesa Verde National Park's paleontological comparative collection. Paleontological studies were conducted in the Chicken Creek Area and along the North Escarpment by Dr. Griffiths. Within the pipeline trench and adjacent to the pipeline right-of-way fossil remains from the Cretaceous age were found. Fossil remains were collected from the upper limestone layer of the Greenhorn Limestone member of the Mancos Formation and the Juana Lopez member of the Mancos Formation. Additional fossils were collected on the surface of the Mancos Shale Formation.

Excavation Methods

Within the Mesa Verde Waterline Replacement Project, it was anticipated that almost every site would have to be dealt with individually. All excavation strategies and methodologies would be standard procedures taken from the Mesa Verde Waterline field manuals (Brisbin 1994; Ives 1994), which were mainly an adaptation of the manual used during the Dolores Archeological Program (Kane and Robinson 1984). Obviously the strategy used to excavate a single small hearth would not be the same as that used on a full scale excavation of a habitation site. However, an isolated feature would be excavated in the same manner as it would if it were on the floor of a pitstructure. In some cases, the features would be more intensively sampled simply because of the uniqueness of the feature type and the multitude of unanswered questions related to it. The data collection strategy used at one site would be formulated against the background of the overall research design.

Field data would be recorded on standard forms for the sake of consistency and to insure that all pertinent information was systematically recorded. In addition to the standard forms, excavation crew members would keep a daily log of their activities and impressions. Maps would be drafted to record plan, profile and stratigraphy of all features; these maps would also be accompanied by photographic documentation. On the larger sites, plan views would be drafted, recording not only the architectural units but all areas of excavations. Floor, surface, or roof fall artifacts would be "point-located" i.e. their location recorded horizontally and vertically so that the exact position point could be plotted accurately on the plan and profile map of that specific study unit. Artifacts from other excavations units, such as fill, would be collected with reference to the unit. Excavation study units could range from 1-x-1 m test units up to 4-x-4 m units. It was preferable to have the actual architectural feature as the study unit: a room, courtyard, or pitstructure. For this reason these would be defined as quickly as possible using test trenches. And when the architectural feature was defined, the initially established artificial grid system would no longer be used in field documentation, the architectural feature would become the study unit. All excavation units would be excavated according to natural stratigraphy.

Summary

The research design for the Mesa Verde Waterline Replacement Project was formulated to be flexible enough to account for the variety of site types which might occur in the construction corridor. The study area transected three ecological zones and sites could conceivably be found from 10,000 years of human occupation. These sites could range from single isolated features of unknown cultural affiliation to the other extreme of large Anasazi or historic habitation sites. Questions of economy and adaptation, social organization, and site formation processes could be addressed depending on availability of site data.

CHAPTER 2

OVERVIEW OF THE MESA VERDE WATERLINE REPLACEMENT PROJECT

Gay Ives

Introduction

The ability to utilize and develop water sources has determined whether humans could survive on the Colorado Plateau since prehistoric times. This chapter deals with the history of water supplies which have been a serious concern for Mesa Verde National Park since its inception. Over the years 1888-1976, Park personnel devised various strategies to provide water. They built large basins to collect rain water, drilled deep water wells, and finally constructed a 63 km (39 mi) water pipeline from the mountain water sources of the West Mancos River (Figure 2.1). After Mesa Verde National Park Superintendent Jesse Nusbaum faced an especially serious water crisis in the 1920s, he referred to the "desperate struggle" for water that had lasted for 3,000 years. In 1979, a multi-phased construction plan, the Mesa Verde Waterline Replacement Project, was formulated to replace the entire water delivery system serving Mesa Verde National Park.

Prehistoric peoples who lived in the area which is now Mesa Verde National Park not only utilized seeps and springs for water sources, but they also built reservoirs and irrigation canals. From the late 1800s until 1935, Euro-American pioneers lived in the eastern portion of what is now Mesa Verde National Park and their existence depended upon locating water sources. They dug water wells, one of which was discovered with the assistance of a "well witcher." After Mesa Verde National Park (the Park) was created in 1906,

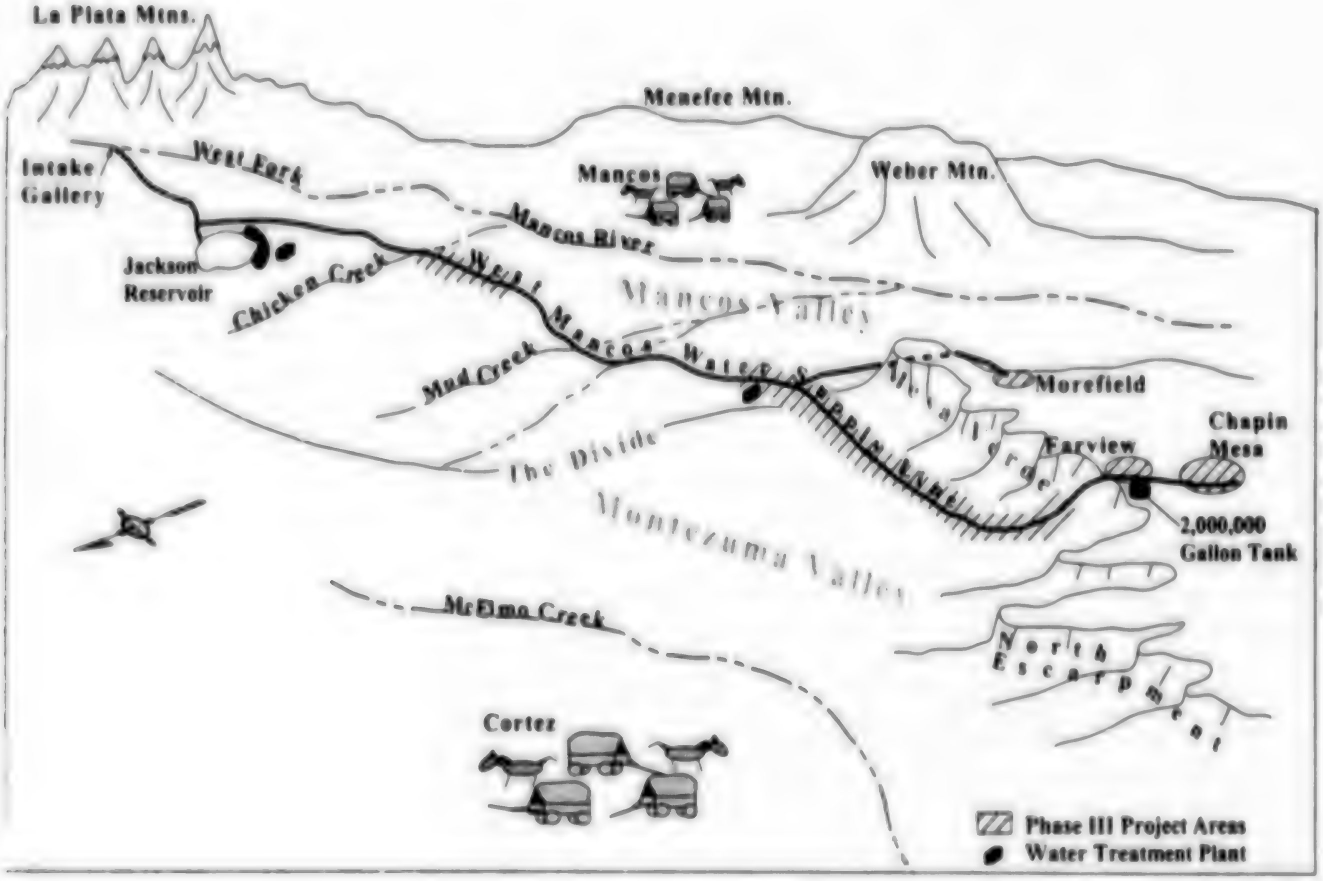


Figure 2.1. Location of West Mancos Water Supply Line.

its fate continued to be shaped by the availability of water to keep pace with the growing visitation.

Underground sources of water were totally inadequate on the mesa tops to serve the needs of employees and visitors. The supply was limited and the water quality poor. Through the years, Park administrators were forced to devote much of their attention to acquiring water. Superintendent Nusbaum became so desperate that he constructed an elaborate system to collect rain water in giant basins. Development of the Park would have been severely curtailed if the West Mancos Water Supply System had not been built during the 1940s and 1950s to transport water from the Mancos River and if the Park had not been successful in securing the rights to use that water.

Within the Park, decisions made about the location of waterlines naturally limited and shaped the design of future development. In the 1950s, attention was focused upon developing the Park interior. In contrast, the 1979 multiphased plan, the Mesa Verde Waterline Replacement Project, was ultimately designed to move most Park administration, employee housing, and visitor services closer to the highway on the Park's northern boundary.

Phase I of the Mesa Verde Waterline Replacement Project entailed construction of a new water treatment plant in 1991. This facility is located within the Park boundary near the main entrance. Phase II consisted of the replacement of two pipeline segments of the waterline on National Park Service, Bureau of Land Management, and private lands.

Phase III of the project included the replacement of pipeline sections at Morefield Campground, Far View, the Park Entrance, and on Chapin Mesa, including laterals and distribution lines, which serve the headquarters and housing areas, all within Mesa Verde National Park boundaries. Additional sections of the waterline outside of the Park boundaries were replaced: north and west of the North Escarpment of Mesa Verde, in the Montezuma Valley, and in the area of Chicken Creek north of Mancos, Colorado.

Construction work on Phase III began on February 1, 1992, and was completed in the summer of 1993. Archeological fieldwork investigations continued after the waterline construction segments had been finished. All excavations were completed in July 1994.

Summary of the Water Supply History (1888-1979)

The history of supplying water to Mesa Verde National Park includes archeological evidence from the prehistoric inhabitants, archeological and historical evidence from the early explorers and pioneers at Mesa Verde, as well as historical evidence from National Park Service (NPS) personnel.

The Park attempted to drill deep water wells, which were unsuccessful and produced little usable water. The Park also constructed an elaborate facility to collect rain water in large basins, but this system was not enough for visitor and Park use. In the late 1940s and early 1950s, the present 63 km (39 mi) gravity flow pipeline, known as the West Mancos Water Supply System, was constructed to deliver fresh water from the West Fork of the Mancos River to the Million Gallon Tank on the lower end of Chapin Mesa. However, the Park became concerned in 1976 that potentially the West Fork of the Mancos River could go dry. This prompted the Park to design and construct a water treatment plant and intake gallery at the Jackson Gulch Reservoir, north of Mancos, Colorado. Of course, the primary source of water would continue to come from the West Fork of the Mancos River, but now the Park would have a secondary water source from Jackson Gulch Reservoir.

Over time the pipeline deteriorated due to age, corrosion and exposure to the elements. The Jackson Gulch water treatment facility no longer exists. The waterline needed to be replaced in several areas to avoid the total collapse of the water delivery system to Mesa Verde National Park. During the late 1980s work began on the Mesa Verde Waterline Replacement Project.

The next section of this report on Water Supply History summarizes information compiled by Mesa Verde National Park Superintendent Robert H. Rose (Rose 1952) and other historical sources on prehistoric and early historic water development. There are also descriptive sections on the water catchment system (1926), the installation of a sanitary system (1935), the deep water well (1930-1950), the West Mancos Water Supply System (1950), Mission 66 (1956), and the Water Treatment Plant at Jackson Gulch Reservoir (1976).

Evidence of Prehistoric Water Development

Superintendent Rose described the 48 natural springs and seeps that previous surveys located within the Park boundaries (Rose 1952). A survey of the seeps, springs, and wells was conducted in 1935 by Chas W. Quaintance, Resident Wildlife Technician, and Lloyd White of CCC Camp NP-6-C, field assistant, to bring together known information on water that could be developed for administrative and wildlife use (Quaintance and White 1935). Rose felt it was important, if funding were available, to send a crew into the field to inventory all water sources possibly available during prehistoric times and to show the relationship between their locations and archeological sites. Rose wanted to demonstrate the principle "that cultures and civilizations can develop and prosper only where adequate and dependable supplies of good water are available" (Rose 1952:2).

Throughout the Park, it appeared that the local prehistoric inhabitants did not obtain adequate water from either natural sandstone basins, where rain water and melting snow collected, or from springs and seeps. Rose felt that the prehistoric inhabitants must have developed a large scale water storage and irrigation system, and he wanted further research on prehistoric dams, reservoirs, and ditches.

Prehistoric water development was the subject of research before the Park was created. In 1891, explorer W. R. Birdsall observed prehistoric small rock dams (check dams) in drainages throughout the area which would be designated Mesa Verde National Park. He thought that these features served as water tanks or possibly terraces where crops were planted. Swedish scientist Gustaf Nordenskiold concurred with Birdsall's observations. In 1939, Guy R. Stewart of the U.S. Conservation Service, studied the Anasazi check dams and said they were similar to the Hopi terrace gardens and the Zuni river gardens.

As the early European and Euro-American explorers combed the mesas in search of archeological sites, they focused attention on the Far View Ruin complex, located on the upper portion of Chapin Mesa. In 1889, F. W. Chapin examined a large circular depression north of Far View Ruin and claimed that this feature was once a prehistoric reservoir. Thereafter it was commonly called Mummy Lake evidently after the observation that it was a dessicated lake. Gustaf Nordenskiold concurred with Chapin in 1890 and informed him that Richard Wetherill had observed traces of a ditch north of the depression. During the excavations of Far View in 1915, archeologist J. Walter Fewkes believed that the ditches found near the village complex were used for irrigation. Then in 1939 Al Lancaster with the help of Guy Stewart surveyed a ditch that began at Mummy Lake and ended at a check dam above the head of Spruce Canyon near the Park Headquarters. This demonstrated the extent and nature of prehistoric water development. Archeological surveys conducted in the 1960s and 1970s recorded 3,381 check dams, 18 reservoirs, 1 ditch, 1 long pecked groove, 441 terraces, and 9 pecked catch basins all associated with prehistoric water development in Mesa Verde National Park (Hayes 1964; Rohn 1977; Smith 1987).

Early Historic Water Development (1888-1925)

From 1888 to 1908, the major springs and seeps in the area were the principal water sources for the early explorers, pioneer homesteaders, visitors, and their livestock. There was little modification or development of the springs, other than cleaning them out and constructing sandstone curbing to pool water and increase the yield. Three springs were especially important in those early years because of their yield and their proximity to the major cliff dwellings: Fewkes Canyon Spring, Balcony House Spring, and Spruce Tree Spring. The single most important water source was Spruce Tree Spring, located at the head of Spruce Tree Canyon and north of the famed cliff dwelling, Spruce Tree House. Due to its location, its yield, and its dependability, the spring influenced the location of the Park Headquarters near this water source. The spring provided enough water for domestic and livestock consumption until the late 1920s. Homesteaders in Morefield Canyon successfully dug a well for their livestock in 1895 or 1896, prior to the Park's establishment. The pioneer woman, colorfully named "Oregon Territory" Morefield, asked water witcher, Bill Lyons, to confirm her choice of sites. The shallow well which they found produced water without a pump, but Morefield later installed a windmill pump. The well, which was known as the Morefield Well and as Dug Well #1, was used until at least 1925 (Myrtle Morefield Emerson interview, March 7, 1978, with

Marilyn Colyer and Gay Ives, Mesa Verde Research Center Archives 2)

After the establishment of the Park, Superintendent Hans M. Randolph wanted to increase the water supply for domestic animals and for pack and saddle horses. In 1908, he directed a project which involved construction of a dam at the head of Spruce Tree Canyon and of a number of cisterns. There were 80 visitors recorded in that year. Then, in 1911, Acting Superintendent Richard Wright asked the chief geographer at the United States Geological Survey (USGS), Robert B. Marshall, to evaluate the springs and look for alternative water sources. Marshall became concerned that the Spruce Tree Spring and Balcony House Spring would not provide enough water to serve the number of visitors expected upon the completion of the new wagon road into the Park. Geological surveys were conducted in 1911 and 1912 to look for additional water sources, such as artesian water. USGS Chief Geographer, W. C. Mendenhall, reported no possibility of an artesian water supply on the surface of any of the mesas within the Park. He recommended improving Spruce Tree Spring, constructing additional reservoirs, and digging some water wells. Deep wells were dug to 9 m (30 ft) and windmills erected at the heads of Navajo, Prater, Moccasin, School Section, and Soda Canyons to provide water during the construction of the new wagon road (Torres-Reyes 1970) (Figure 2.2).

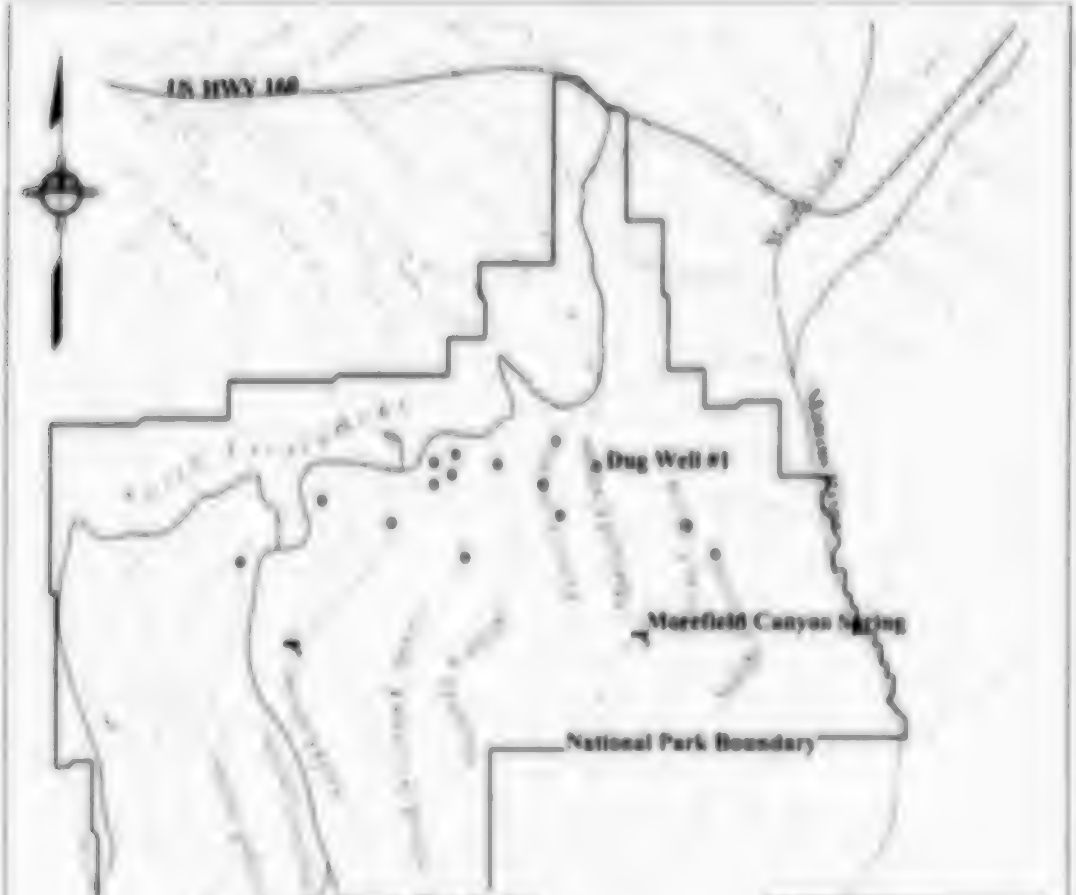


Figure 2.2. Early historic water development in Mesa Verde National Park.

The wagon road was finished late in the summer of 1913, bringing visitation to an all time high of 280. Then in 1914, the entrance road was opened to automobile travel and Park visitation increased to 502. When visitation rose to 2,058 in 1918, it prompted Superintendent Thomas Rickner to become concerned about developing better water sources. By this time the Park Headquarters area had grown and a new hotel was operating. Rickner stated in his 1918 annual report that a gasoline engine and pump had been installed at Spruce Tree Spring connecting the cisterns, and a new water tank had been built above the hotel. The water tank was "built high enough to give pressure to all parts of the camp" (Rose 1952:19). These improvements were significant to the Park's development.

A crisis began developing in the 1920s, when the Park endured months without precipitation. An adequate water supply system was the Park's number one priority. During this time, additional cisterns and storage tanks were installed. By 1922 visitation had soared to 4,251. Superintendent Jesse Nusbaum stated in his 1923 annual report that the increasingly grim water situation nearly resulted in the closing of the Park. In order to supply visitor needs, all construction projects were stopped temporarily and Nusbaum sent the labor force outside of the Park. In 1923, visitation increased to 5,236 and a spring drought made the situation even more desperate.

An amazing discovery occurred in 1925: nearly 200 prehistoric dams had been built to store flood waters in a small spur canyon. It was quite obvious that the prehistoric inhabitants had also contended with water supply problems. This discovery sparked the construction of two modern dams and the piping of water into reservoirs and storage cisterns. These large dams helped but did not alleviate the situation. Nusbaum wrote that development of water supplies "had not kept pace with increased attendance" (Torres-Reyes 1970:152). Visitation had reached an all time high of 9,034. Large tanks and underground cisterns were installed. Nusbaum believed that if he could utilize all of the water wells located throughout the Park, these wells could potentially supply enough water. However, several wells were not fit for human or livestock consumption because of the high content of gypsum and alkali, which caused a bitter taste. The well production was intermittent. To connect all of the wells by pipeline would have been very costly. For a future supply of water, Nusbaum proposed "a gravity line from the mountains above Mancos to the park, a distance of 30 miles [48 km], at an approximate construction cost of $300,000" (Torres-Reyes 1970:154).

Water Catchment System (1926)

In August of 1925, the Subcommittee on Interior Department Appropriations of the House Appropriations Committee and representatives from the Interior Department's Bureau of the Budget spent time studying the Mesa Verde National Park water supply problems. O. E. Meinzer, USGS, was sent to Mesa Verde to report on the best solution. Meinzer concluded:

> 1-projects for developing underground water were uncertain as to quantity and quality, or both; 2-a 30-mile pipeline carrying water from Crystal Creek, in the La Plata Mountains, would furnish a very satisfactory supply, but would cost too much in proportion to the small community that it was to serve, 3-catching rain and snow water on specially prepared surface and storing it in underground reservoirs that would feed by gravity into the existing waterworks appeared to be a feasible means of providing a permanent supply of water at a reasonable cost (Torres-Reyes 1970:155).

The Park decided to take Meinzer's recommendations to install a catchment system and abandoned the other two proposals indefinitely due to the incredible cost for that time. In 1926 construction began "...on a sloping catchment of galvanized sheet metal, one-acre in extent. Catchment run-off was collected in a trough at the lower edge and conducted through rapid sand filters to two 473,485 liter (125,000 gallon) frost-proof steel tanks. These were connected by a 5.1 cm (2 in) main to the existing distribution system" (Rose 1952:28). This catchment system was located approximately 1.6 km (one mile) north of the Park headquarters and east of the present day Hogan Area (Figure 2.3). Approximately 1,515,151 liters (400,000 gallons) of melted snow and rain water were collected per year.

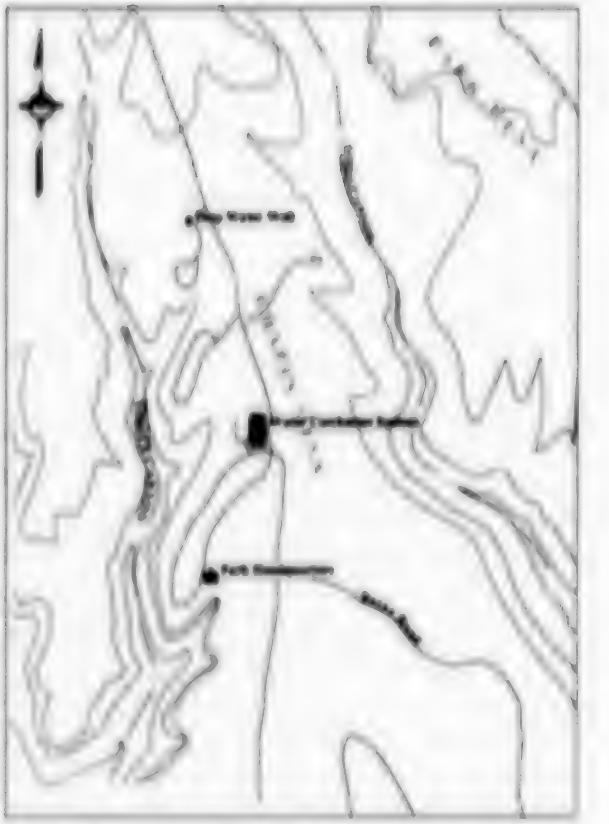


Figure 2.3. Location of Catchment System and Deep Water Well on Chapin Mesa.

In the late 1920s, the Park was uncertain that the quality of water would be satisfactory for human consumption after being stored in steel tanks for long periods of time. Water from the catchment system was dirty and contaminated. Rats, mice, lizards, and birds in all stages of decomposition were found floating in the reservoir storage tanks. The outlet was loaded with animal skeletons. One report stated that approximately 156 dead animals were removed at one time. This water from the reservoir was consumed by the Park Service employees and their families and was served to the public. The water from the reservoirs sometimes reached a temperature of 43° C (110° F) and contained a large quantity of mineral deposits such as gypsum and alkali. The water reportedly clogged automobile radiators and killed plants in the gardens. Every year there was an outbreak of diarrhea. The situation was investigated, but the cause and the source of this disease was not identified. The water posed a serious health risk for government employees, their families, and the public (Torres-Reyes 1970:241-242).

The Mesa Verde Water Development Committee (Paul R. Franke, Park Naturalist; J. Hamilton, Park Engineer; Chester Markley, Chief Ranger; and Chas W. Quaintance, Resident Wildlife Technician) told Superintendent E. P. Leavitt on May 29, 1935: "All water should be tested. It is suggested that samples of water from each site (referring to all wells and reservoirs) be obtained and sent away for analysis. In the event of any possible breakdown of the water supply system, we shall know what water is fit for human consumption" (National Park Service Memorandum to Superintendent E. P. Leavitt, May 29, 1935, Mesa Verde National Park). The water was then tested by the Public Health Service, which concluded that construction of concrete tanks instead of steel tanks would be better for health purposes. Chas Quaintance also felt that the Park should keep water census records up to date and correlate the findings. He also thought the Park should talk to the local stockmen to determine their knowledge of watering places which the Park could utilize (Quaintance and White 1935).

In the late 1920s, visitation to the Park increased to 11,256. A second, .4 ha (one acre) catchment system with two additional concrete reservoirs with 946,970 and 284,090 liter (250,000 and 75,000 gallon) capacity were completed in January 1929. By 1930, visitation reached 16,656. For the next two years, the precipitation was poor, and it became obvious to Superintendent Nusbaum that the catchment systems did not solve the water problem. He foresaw that as visitation increased, the Park would have to construct acres upon acres of catchment systems to provide enough water for modern conveniences and sewage disposal, a project which was not feasible at the time.

Installation of the Sanitary System (1935)

One of the most immediate concerns for the Park was the sanitary system. There were large numbers of earth pit and chemical toilets, mainly on the lower end of Chapin Mesa. Only eight cesspools were constructed to take care of the sewage from the residences, ranger quarters, and the hospital. Wastes from the mess hall were discharged into the canyons below. The cost of removing and hauling the waste from the cesspools and chemical toilets was quite expensive. There is no mention of where the sewage from the government buildings was dumped--outside of the Park or within the Park boundaries. A few chemical toilets were provided in comfort stations for visitors' use, but there were no flush toilets or running water. Simple "honey buckets" (slop jars) were all that was provided in the concessioner's cabins. The remoteness of these cabins along the canyon rim in dense forests with no vehicle access meant that sewage waste from the honey buckets was simply thrown over the rim of the canyon.

U.S. Public Health Service Sanitary Engineer H. B. Hommon wrote a memo to the Park Service Director in 1934 saying,

> the situation of collecting and disposing of sewage at Mesa Verde was the most serious problem existing in any of the national parks in relation to public health and sanitation. It was not only holding back the development of the Park, but it was a serious potential health menace which had to be corrected at the earliest possible time (Torres-Reyes 1970:240).

In 1935 the sanitary system was constructed and placed into operation.

The Deep Water Well (1930-1950)

Nusbaum and Meinzer decided to try one more experiment to resolve the water supply problem. Nusbaum learned that wells had been drilled south of the Park and, in a number of cases, volumes of water were flowing under high pressure. Therefore, Nusbaum ordered a geologic reconnaissance of the Park. Geologists and representatives of various oil companies operating in the Four Corners Area helped locate a site within the Park. The deep water well was located where Natural Resource Building #59 now stands, south of the Million Gallon Tank on Chapin Mesa. Nusbaum wrote in his 1929 annual report:

> It is interesting to note here that archeological investigations tell us that for the past 3,000 years a desperate struggle for water has been waged by the inhabitants of this region. The Cliff Dwellers, at a time about 1276 A.D., were undoubtedly forced from the Mesa Verde because of a long period of drought, and evidence remains to-day of the innumerable dams which they constructed for impounding the rainfall. If man, with his increased knowledge and mechanical appliances, can produce water from the deep strata of Mesa Verde, it will bring to an end this struggle of many centuries (Torres-Reyes 1970:159).

The deep well was drilled in December 1930 by L. E. Teague of Aztec, New Mexico. At a depth of 1245 m (4,085 feet), water in great volumes poured into the drill hole. The final spudding depth reached 1278 m (4,192 feet). In June 1933, all aspects of the drilling operation were completed. From 1934 to 1950 the operation of the deep well suffered frequent breakdowns. The two most serious breakdowns occurred in 1938 and 1948. Experts tried to understand the well's erratic behavior, but the problems were never resolved. Reconditioning and repairing the well was very costly to the Park. Superintendent Rose states:

> The deep water well, the catchments and the Spruce Tree Spring system were all integrated into a single system except for special distribution lines that provided for a separate supply from the spring system to certain residences, Spruce Tree Lodge and public drinking fountains in the immediate vicinity of park headquarters. The integrated water systems continued to operate in this manner until completion of the new West Mancos Supply System in the summer of 1950 (Rose 1952:32).

The West Mancos Water Supply System

By the end of the 1930s it became quite apparent that the only solution to the Park's water dilemma was to bring water from the La Plata Mountains above Mancos, Colorado. Such a pipeline project was contingent upon federal approval and construction of the Mancos Project (Torres-Reys 1970:244), a federal Water Conservation and Utilization Program which included the construction of the Jackson Gulch Reservoir, Jackson Gulch Inlet and Outlet Canals, and the Mesa Verde Pipeline (Transcript of Evidence, Volume II, on the subject of "In the Matters of the Adjudication of Priorities of Water Rights to be Used of Water for Irrigation in the Water District No. 34"). With the rapid increase in Park visitation from 21,474 in 1934 to 42,079 just prior to the outbreak of World War II, with the expansion of the Park and concession operations, and finally with the serious breakdown of the deep water well there were three major justifications for constructing the 63 km (39 mi) water pipeline which would be known as the West Mancos Water Supply System (Rose 1952).

The Mancos Project

Irrigation in the Mancos Valley started about 1876 using the natural flow of the Mancos River as an unregulated and inadequate water supply. Following the construction of the Rio Grande Southern Railroad through Mancos in 1892, farming, ranching, logging, and lumbering operations developed (United States Department of the Interior Bureau of Reclamation (USDI BOR) 1943, 1945). But, the Mancos Valley suffered through droughts much as Mesa Verde National Park did, and the uncertain water supply stifled economic progress for a number of years.

The Mancos Project was one of many similar 1930s "work relief" projects considered for the Western Slope of Colorado (Gleyre and Alleger ca. 1930s:14). It was designed primarily to provide irrigation for 5263 ha (13,000 acres) of farm land in the Mancos Valley at a cost estimate of $1,600,000. Part of the project involved construction of the Jackson Gulch Reservoir which would provide a dependable supply of stored water to supplement water from the Mancos River. This would insure that the community would have enough water and allow more diversified farming throughout the Mancos Valley.

In 1940, President Franklin D. Roosevelt approved the Mancos Project and by 1941, the Bureau of Reclamation was finally authorized to build the Jackson Gulch Reservoir under the terms of the Water Conservation and Utilization Act (known at the time as the Wheeler-Case Act) (Pelz 1972:668-679). Money was appropriated to the National Park Service on June 28, 1941 to begin the construction of the pipeline known as the West Mancos Water Supply System from the West Fork of the Mancos River to the Park.

However, from 1942 to 1953, a court battle over the adjudication of water rights pitted the local farmers and ranchers in the water district against the National Park Service and the Bureau of Reclamation. The cost of the litigation increased the cost of the Jackson Gulch Reservoir. It was expected to take approximately four years and cost approximately $1.8 million. The actual cost was $2.7 million (Gary Kennedy, Mancos Water Conservancy District, personal communication 1995).

To construct Jackson Gulch Reservoir and the West Mancos Water Supply System, the Bureau of Reclamation employed laborers who were hired under the Works Progress Administration in 1941 and 1942. Later (1943-1946), laborers came from the Civilian Public Service (Conscientious Objector) Camp (Tom Vaughan, personal communication 1995). The Civilian Public Service crews, under the Selective Service program, helped to relieve labor shortages at Bureau of Reclamation projects during World War II. These men constructed the upper portion of the West Mancos Supply Line of the West Mancos Water Supply System from the river intake gallery location to Jackson Gulch Reservoir area (Figure 2.4). This line supplied water to their camps near the Reservoir construction. That same waterline still supplies water to the Mancos

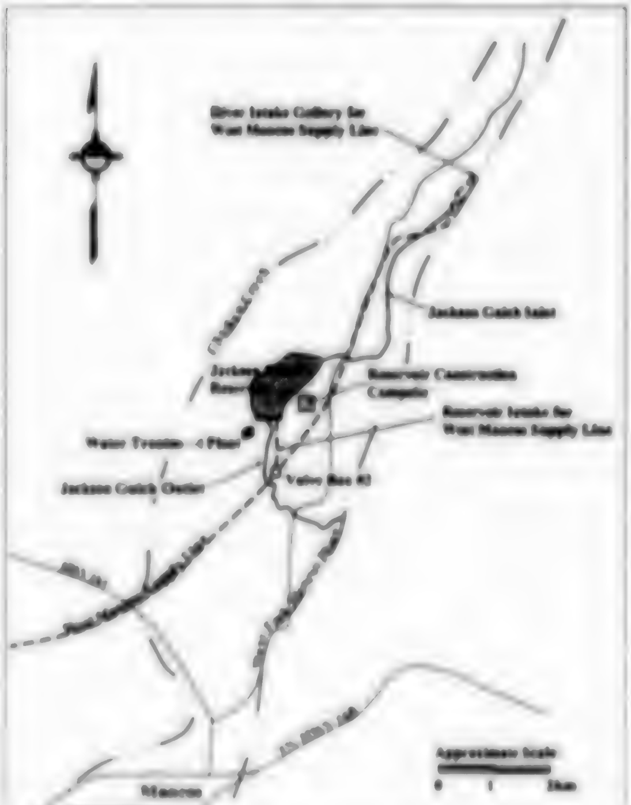


Figure 2.4. Upper portion of the West Mancos Water Supply System.

Water Conservancy District Office, which is located at the site of the camps (USDI BOR 1943:3).

At the Mancos Project, an average of 149 Civilian Public Service workers were employed during June 1945. These men were used for firefighting, operation and maintenance, and clean up work (USDI, BOR 1945:21). Construction on the Mancos Project was interrupted for 15 months (Feb. 1946-May 1947) during World War II. After World War II, in May of 1948, the construction contract for the Mancos Project was awarded to the Vinnell Company, Inc., of California. The dam and reservoir were completed in December 1948. Water was released from the Jackson Gulch Reservoir at a dedication ceremony in July 1949.

West Mancos Water Supply System for the Park

The West Mancos Water Supply System for Mesa Verde National Park included the intake gallery on the West Fork of the Mancos River and the water pipeline from the intake to the Million Gallon Tank on Chapin Mesa in the Park. Construction began on the West Mancos Water Supply System Intake Gallery, located on the West Fork of the Mancos River, on July 14, 1949. Funding for the West Mancos Water Supply System Pipeline to deliver water from the Intake Gallery to the Park was estimated at $324,000 for fiscal year 1950. The contract was awarded to Delmar M. Spafford of Farmington, New Mexico, and on May 6, 1950, construction began on the West Mancos Water Supply System Pipeline.

Working north from the Million Gallon Tank, Spafford's crew laid a total of 43.7 km (27.07 mi) of pipeline (Nelson 1951). When the line was finished, water was gravity fed through the West Mancos Supply Line (Figure 2.5). The line started at an elevation of 2524 m (8,280 feet) at the intake gallery, traversed the Mancos Valley and the Montezuma Valley along the base of the North Escarpment of Mesa Verde, then continued up over the escarpment rim at an elevation of 2462 m (8076 feet), then down and southward on Chapin Mesa to the Million Gallon Tank at an elevation of 2195 m (7198 feet). The water was disinfected at the Million Gallon Tank where the chlorination system was one of the first of its kind within the Park boundaries. The Superintendent recorded every detail of the historic event:

> By radiogram to the Regional Office dated June 30, 1950, the Superintendent advised that the connection of the pipe at the intake works was made on June 29 at 3 p.m. and that back filling of the trench was completed at 5:30 p.m. the same day. During line testing operations water was brought to the foot of Navajo Hill on Chapin Mesa at 3 p.m., July 5, 1950. At 12:45 p.m., July 6, water began flowing from the free end of the line at the 1,000,000 gallon reservoir. The turbid water gradually cleared and at 2

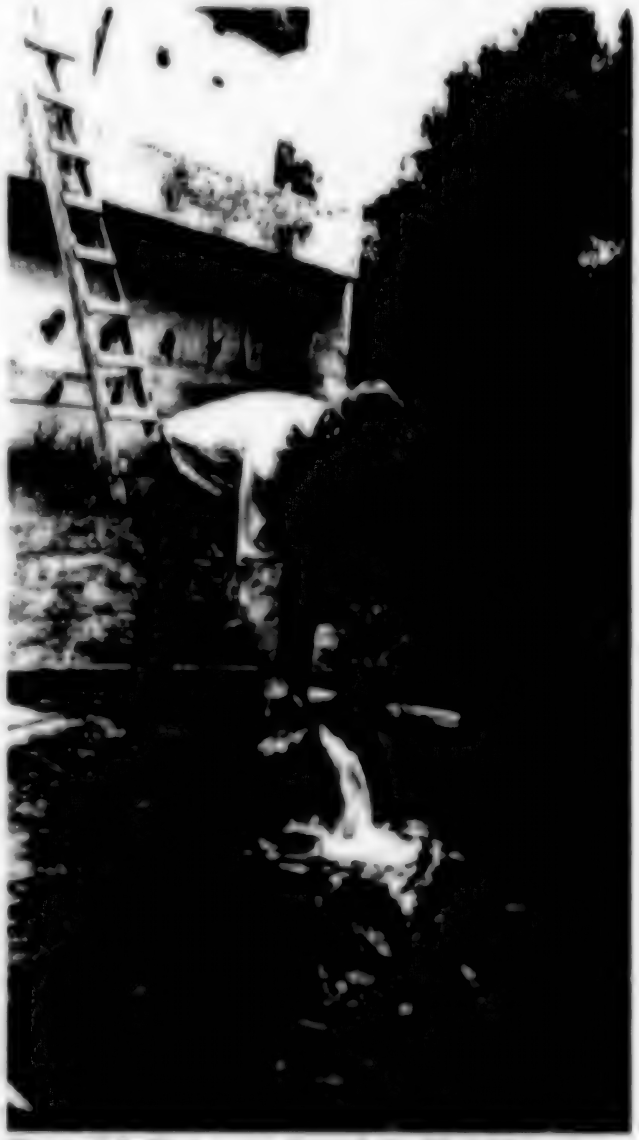


Figure 2.5. First water through the West Mancos Supply Line (probably Supt. Robert Rose).

> p.m., July 19, diversion into the 1,000,000 gallon storage reservoir began. For the first time in 2,000 years, therefore, through the genius of the Machine Age, water from a source beyond the reach of the Stone Age inhabitants was brought into Mesa Verde. July 19, 1950 must now be added to the list of significant dates in the human history of the area (Rose 1951:49).

By November 1950, the Entrance Checking Station, Residence #41, and the Point Lookout Lodge were connected to the water supply line. This would enable the Park to develop the entrance area in the future. In December of 1950, members of the National Park Service, Bureau of Reclamation, and Soil Conservation Service inspected the right-of-way to plan a joint soil and erosion control program for the waterline. The group decided to reseed the right-of-way and construct flood water diversion blocks. Due to drought conditions in the summer of 1951, the diversion blocks and the reseeding of the right-of-way were not completed until the fall. Four hundred diversion blocks were constructed, and 18 ha (45 acres) of right-of-way were reseeded (Nelson 1951).

Catchment System Dismantled

Soon after the completion of the West Mancos Water Supply System, the Park began to dismantle the catchment system. The superintendent wrote: "It is expected that within a few years both the well and the catchment installation will be removed which will leave but little, if any, evidence of these significant chapters in the history of the quest for water on the Mesa Verde" (Rose 1950:52). The two 473,485 liter (125,000 gallon) steel tanks which served the catchment system were condemned and eventually removed. All of the well equipment including the deep water well equipment was declared surplus, and the equipment was transferred to be used elsewhere, dismantled, or sold. Spruce Tree Spring, the pumphouse, storage tanks, pumping equipment, and distribution lines were eventually dismantled and the Spruce Tree Spring area restored.

The construction of the West Mancos Water Supply System forever changed Mesa Verde National Park. The waterline represents the Park's only life line for survival. With his keen sense of history, Superintendent Robert Rose summarized the future significance of his administration's accomplishment:

> It appears that the days of having to depend upon springs, seeps, check dams, reservoirs, precipitation catchments and wells for primary sources of water in the Mesa Verde are gone forever.... unless future years should bring about an atomic war of annihilation whereupon it is conceivable that the few survivors, like the Mesa Verde Indians of old, may be forced to build caves and burrow into the earth for shelter and protection. If such catastrophe ever befalls mankind, history would repeat itself with a new generation of human beings again wearily making their way up the slopes and canyons of the Mesa Verde seeking shelter and protection in natural caves and by digging into the earth from above. In that event, the springs, seeps and the rain would again become the chief sources of water in a new era of primitive habitation as they were in the prehistoric period of occupation (Rose 1951:53).

Mission 66

In 1956, the National Park Service initiated a ten year program called "Mission 66," which was to develop and staff the parks in order to meet the projected needs of 80 million visitors throughout the National Park System by 1966. Inadequate facilities were to be replaced with more modern facilities, enabling the parks to provide adequate services and protection for both the public and the resources.

In Mesa Verde National Park, the primary objective of Mission 66 was to protect both the scenic and the prehistoric resources despite increases in visitation. The plans included decentralizing and dispersing facilities, making them efficient, minimizing damage to natural resources, and controlling overall Park development. During the new development, the Park was limited by the legal stipulations of the Antiquities Act of 1906, the distribution of the archeological sites, and the topography of the Park. After the construction of the West Mancos Water Supply Line, water supplies did not pose a major limitation but the distribution of the water to new facilities had to be considered. The Park headquarters area on Chapin Mesa was the most congested with inadequate visitor services and parking, a problem which continues today. The three existing campgrounds at the lower end of Chapin Mesa were also overcrowded. In 1956 visitation was 186,808.

For Mission 66, the Park developed a phased program of physical and management improvements of which the water distribution system was a critical aspect. The physical improvement program provided for developing new sites for visitor use (Morefield Canyon, Navajo Hill, and Wetherill Mesa) and for rehabilitating and improving certain existing developments at Spruce Tree Camp (Torres-Reyes 1970:333). Morefield Canyon was to be developed as a 500 site campground, including ancillary services. Wetherill Mesa was to be developed as a complete interpretive area equal to Chapin Mesa in order to relieve visitor congestion on Chapin Mesa. Navajo Hill would be established with a visitor center as a control and dispersal point. The Park Headquarters area was also scheduled for reconditioning. The Mission 66 plan provided for revamping the Park Entrance area with a new entrance station, comfort station, and road improvements. Water would be needed at all these physical improvements (Figure 2.6).

Prior to constructing the Morefield Campground, the Park utilized an overflow campground directly southeast of an old reservoir at the base of Point Lookout. (This area was also used as a road construction "spike camp" during the 1920s and 1930s.). Water was

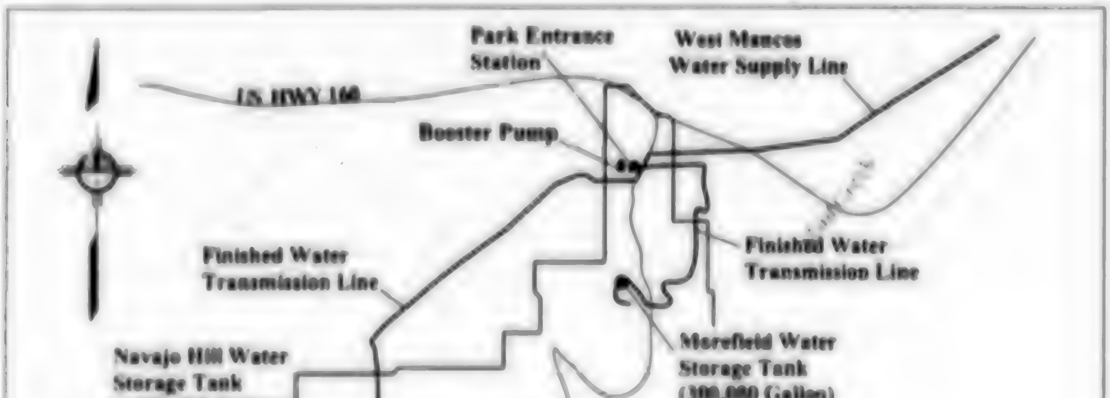

Park Entrance Station
West Mancos Water Supply Line
US HWY 160
Booster Pump
Finished Water Transmission Line
Finished Water Transmission Line
Morefield Water Storage Tank (300,000 Gallon)
Navajo Hill Water Storage Tank (2,000,000 Gallon)
Wetherill Mesa Water Transmission Line
Farview Annex
Farview Visitor Center
National Park Boundary
1,000,000 Gallon Water Storage Tank
Wetherill Water Storage Tank
Legend
© Sewage Disposal Pond
Approximate Scale:
0
2
4km

Figure 2.6. Major water developments in Mesa Verde National Park prior to 1979.

pumped from the West Mancos Supply Line south along the ridge to a water tank and then fed by gravity to the campground. This system was used until 1967 when the Morefield Campground was completed. Although the water system and the campground have been abandoned, the equipment still remains today. The reservoir became a sewage lagoon during the 1960s; today very little if any water pools behind this dam (Bob Bangs, retired Chief of Maintenance, personal communication 1995).

In 1967 Morefield Campground and Village opened for campers. These facilities and the Morefield Ranger Station were served by the Morefield Water Storage Tank (1,136,364 liter) (300,000 gallon), located on the northern slope of Kiva Point. The tank is filled by a "finished water" transmission line which was built during the 1960s along the base of the East Escarpment of the Park. "Finished water," as used throughout this report, means water which has been completely processed, as opposed to "raw water," which has not been treated at all. From Montezuma County Road H, this water transmission line heads south and then follows the old switchback road to Nusbaum Cut ("A-Cut"). From Nusbaum Cut the waterline heads westerly to the storage tank.

The West Mancos Water Supply Line received some attention during the rehabilitation and improvements of the Park associated with Mission 66. The Park decided to clean and line a steel section of the water line from the intake gallery at the West Fork of the Mancos River to Highway 160. The cement liner was needed to eliminate rust, to prevent corrosion, and to increase smooth water flow. Approximately 21,341 m (70,000 ft) of pipe was lined (NPS Branch of Engineering, Region 3, 1962). The cleaning removed corrosion that had built up within the pipe (Harold Welty, NPS Mesa Verde Water Treatment Plant Utilities Systems Operator, personal communication 1995) (Figure 2.7).

Figure 2.7. Lining the waterline with cement.

At Navajo Hill, the Far View Annex with the concessioner's motel, restaurant, and cafeteria was opened in 1964 and the Visitor Center in 1968. To supply water, a transmission line was built from the Navajo Hill Water Storage Tank to the Visitor Center and the Far View Annex. Just west of the Entrance Station, the Park installed a booster pump to help feed the Navajo Hill Water Storage Tank. This tank was constructed in the 1950s and is also known as the Two Million Gallon Tank. It is located at the head of East Fork Navajo Canyon on the North Escarpment. As part of Mission 66, sewage disposal ponds were constructed east of Far View Annex in Little Soda Canyon.

Wetherill Mesa was opened to visitation in 1973. A 21 km (13 mi) finished water transmission line was constructed along the road from the Navajo Hill Storage Tank to Wetherill Mesa to provide water to the facilities.

Water Treatment Plant at Jackson Gulch Reservoir (1976)

With the passage of the federal Clean Water Act in 1976 and with Park visitation climbing to 676,935 the Park focused again on water quality and water supply. The Clean Water Act imposed stricter conditions on water treatment and with the increased visitation the Park Service became concerned that in a drought year the water supply from the West Fork of the Mancos River would not be sufficient. Access to stored water from the Jackson Gulch Reservoir would provide a supplementary water source and a water treatment plant at that location would fulfill the requirements of the Clean Water Act.

The Park Service, Bureau of Reclamation, and the Mancos Water Conservancy finalized an agreement in 1976 providing rights to the Park to store, divert, and use water from Jackson Gulch Reservoir. They agreed to enlarge the outlet pipeline to serve both the Park and the Mancos Rural Water Company. The Bureau of Reclamation granted the Park the right to construct a water treatment plant on lands acquired in fee for Jackson Gulch Reservoir. The Bureau also granted the Park the right to construct pipelines (a 15.4 cm pipeline and a 6.4 cm pipeline) (a 6 inch pipeline and a 2 1/2 inch pipeline) in the Jackson Gulch Outlet Canal right-of-way (Switzer 1977).

The Park completed construction of a Water Treatment Plant for providing chlorinated water at the base of Jackson Gulch Reservoir, just southeast of the Mancos Rural Water Company Treatment Plant in 1976. If the Mancos River should dry up for any reason the National Park Service would use water piped from the Reservoir to a valve box on the West Mancos Water Supply System.

The Waterline Replacement Project (1979-1995)

Plans for the Mesa Verde Waterline Replacement Project began in 1979 as part of the Park's development concept plan under the 1979 General Management Plan. The Plan identified the number one priority in the Park: to upgrade the water system (USDI, NPS 1979:10). The development concept plan also outlined the future needs at the entrance area, Morefield Campground, Park Point, Far View, Far View Ruins, Chapin Mesa, Wetherill Mesa, and the Park in general. "These concepts were based upon legislative and administrative constraints, management objectives, resource capabilities and limitations established in the approved Resource Management Plan and Wilderness Recommendations, and the public's desires" (USDI, NPS 1972:1). It was clear that any development was contingent upon upgrading the water system. The water treatment plant at Jackson Gulch Reservoir proved inadequate to supply the volume of water needed for increased visitation. In addition, the costs of operating and maintaining the plant were high and the plant had marginal technology for the more stringent federal U.S. Environmental Protection Agency (EPA) regulations which required filtering of drinking water.

A multiphased Water System Improvement Project for Mesa Verde National Park was developed to address the needs expressed in the 1979 General Management Plan. The Park decided to construct a new water treatment plant to meet federal standards, replace sections of the West Mancos Water Supply Line, and upgrade the water distribution system within the Park (Harold Welty, NPS Mesa Verde Water Treatment Plant Utilities Systems Operator, personal communication 1995).

The engineering plans to upgrade the water system were designed by a private contractor, Richard Arbor Associates, Inc., Denver, Colorado. Arbor Associates Chief Engineer, Terry Howes, worked closely with the National Park Service Denver Service Center's (NPS DSC) Central Design Team to develop the multiphased Water Systems Improvement Project. The project included designs for the new water treatment plant (Phase I) and the waterline replacement projects (Phases II, Phase III, and Phase IV). The cost for the design sequence contract for the multiphased project originally was estimated at $192,969. This also included the surveying work by Arbor Associates for the location of the new water treatment facility.

Numerous extensions and modifications to the original design contract with Arbor Associates were granted from 1989 to April 1993. These modifications included making continual changes in design of the Water Treatment Plant, developing the facilities manual, designing Phase II and Phase III, providing salary increases, producing a technical report for Phase IV, and developing design plans for the final Phase IV. Twenty-six approved "Amendments of Solicitation/Modification of Contract" were granted to Arbor Associates, Inc. at a cost of $1,487,016. The total cost for the design of this multiphased project was $1,679,976.

Phase I: Water Treatment Plant

In 1988, the Phase I environmental assessment/comprehensive design plan for the Water Treatment Plant was prepared to address specific issues of the 1979 Development Concept Plan, including service roads and associated utilities as well as the water treatment plant (USDI, NPS 1988:3). Work had already begun on the design of the New Water Treatment Plant to be located at the Park Entrance Area. The estimated project cost was $2,214,000 for the general construction of the raw water pipelines, finished water pipelines, pressure reducing stations, paved roads, and the new water treatment plant (NPS Section 01010-1 1989). The plant itself would consist of a 346 m^2 (3,720 square foot) building, a half acre-foot holding pond, and a 1859 m^2 (20,000 square foot) filter backwash pond (USDI NPS 1988:3). On August 8, 1989, John Aller, Montezuma County Health Department, approved the design plans for the new Water Treatment Plant.

On February 15, 1990, NPS DSC Contracting Officer Mary E. Reiter sent out the "Notice of Award" to Luther Construction Company, Albuquerque, New Mexico, under the Contract No. CX-1200-0-9002, Project No. IFB MEVE-223-R. The bid submitted for the construction of the Water Treatment Plant Project was accepted, and a contract was awarded in the amount of $1,809,337.31 under Alternative A. This was the lowest of the bids submitted from four different contractors. The company was notified to proceed with the work on Monday, April 2, 1990. Construction of the treatment plant went according to plan with only seven "Amendment of Solicitation/ Modification of Contract" by the contractor. The new water treatment plant was completed October 15, 1993, at a cost of $1,991,774, which was $182,437 over the original contract amount. This facility is one of the few high tech, state-of-the-art water treatment facilities in this area.

Phase II: Waterline Replacement

Phase II provided for replacing two segments of the existing West Mancos Water Supply Line under Contract No. CX-1200-0-9004, RFP MEVE-223A. In 1990 Goff Engineering and Surveying, Durango, Colorado, began work on their $21,440 contract to survey the existing waterline. On August 2, 1990 the contract for Phase II, Water Systems Improvements Project, was awarded to Weeminuche Construction Authority, Towaoc, Colorado in the amount of $1,014,918. On September 26, 1990, NPS DSC Contracting Officer Robert Laubenheim sent a "Notice to Proceed" to Weeminuche to start construction. Weeminuche Construction Authority had one year to complete the project unless extensions were granted.

A large portion, 1433 m (4,700 linear ft), of the West Mancos Water Supply Line was replaced. The first section, approximately 243 m (800 linear ft), was located within the eastern boundaries of the Park and on private lands in Sections 32 and 33 of Township 35 North, Range 14 West. The second pipeline section was located on the West and East Fork of Mud Creek in Sections 35, 26, 25, 30, and 19 of T35N, R14W and R13W. These lands were either owned by private individuals or the BLM.

Construction of the two pipeline sections for Phase II of the Water Systems Improvements Project went as planned with the exception of eight "Amendments of Solicitation/Modification of Contract." The Phase II Water Systems Improvement Project was completed on time on November 26, 1991, at a cost of $1,074,053, which was $59,133 more than the original contract.

Phase III: Waterline and Distribution System Replacement

Phase III of the Waterline Replacement Project involved replacing parts of the West Mancos Water Supply Line, upgrading access roads to the waterline outside the Park, and replacing the water distribution system to three developed areas within the Park. Of the 14 km (8.8 mi) of the West Mancos Water Supply Line to be replaced, 11 km (6.8 mi) were outside the Park on Bureau of Land Management, state, or private land. Of the 17 km (10.5 mi) of dirt surfaced access roads to be improved approximately 7 km (4.4 mi) were along the water pipeline right-of-way and 9.8 km (6.1 mi) provided access to the pipeline. The replacement of the water distribution system included work at Morefield Campground, Navajo Hill-Far View Annex, and the lower portion of Chapin Mesa.

In the original environmental assessment for waterline replacement, Superintendent Robert Heyder predicted no significant impacts from excavating and replacing soil for the project.

> Vegetation would be temporarily disturbed on approximately 35.8 acres, most of which would be revegetated. Wildlife habitat would be temporarily disturbed on approximately 32 acres and would be lost on 7.4 acres. There would be no effect on floodplains or wetlands. Known archeological and historical resources would be avoided

> where possible, with salvage on several sites prior to construction disturbance.
>
> No negative impacts on threatened or endangered species are expected. The only threatened plant (state listed) present is Scholl's milkvetch. Where these plants are found they will be transplanted, and seed will be collected from this year's plants for sowing next year, following construction. This plant's preferred habitat is disturbed terrain and it is expected to recover on the disturbed areas [NPS 1991:i].

The document said that without the pipeline work, the Park water distribution system would eventually fail (NPS 1991:i).

Originally the existing waterline was to be removed and the pipe sold for scrap. Due to costs, this plan changed and most of the original line was abandoned in place. Certain sections of the pipeline and the cement headwalls had to be removed where they crossed arroyos because the line had been suspended in air at the crossings and exposed to the elements.

On September 27, 1991, NPS DSC Central Team Manager, Kenneth Raithel Jr., sent out the "Contract Award Notice" to Gonzales Construction Company of Dolores, Colorado, under Contract No.CX-1200-1-9004, IFB MEVE-223B. Mountain Gravel and Construction Company of Dolores, Colorado was subcontractor under Gonzales Construction Company. Out of four contractors that were present for the pre-bid meeting only one provided a bid. The bid, just under the government engineers' estimates, including all additives was accepted and a contract awarded in the amount of $3,486,034.

By January 6, 1991, NPS DSC Contracting Officer Robert W. Laubenheim sent out the "Notice to Proceed and Contract Time."

> That date of Jan. 6, 1992, will then become the first calendar day of the contract period of 570 calendar days unless extensions are granted, will expire on July 28, 1993. Your attention is called to Amendment No. 3 which states in part that, no on-site work will be permitted until Feb. 1, 1992; however, the contractor will be required to proceed with the process of submittals and material acquisition ... (NPS: 1991b)

Gonzales and subcontractor Mountain Gravel had two years to complete the project unless extensions were granted.

Construction of Phase III went as planned with the exception of the demolition of the 946,970 and 321,970 liter (250,000 and 85,000 gallon) reservoirs, transportation and disposal of materials (Additives No. 3 through No. 6), which were taken out of the contract. The Chicken Creek BLM Segment was also deleted from the contract for Phase III and placed in the Phase IV portion of the project. Six "Amendments of Solicitation/Modification of Contract" were added to the contract.

Gonzales and Mountain Gravel Construction Companies completed the contract for the Waterline Replacement Project, Phase III on July 28, 1993, at a cost of $3,720,776. This was $234,742 over the original contract amount. On July 29, 1993, the pipeline work was inspected. A letter of Substantial Completion was sent on September 2, 1993.

Phase IV: Future Water System Replacement

The fate of Phase IV has not yet been determined by the federal government and the National Park Service because of concerns about the possible disturbance of archeological resources and the increased costs associated with Phases I through III. Phase IV was designed to include slant drilling on the North Escarpment of Mesa Verde, replacing the intake gallery on the West Fork of the Mancos River, replacing pipeline segments on Chicken Creek and along the switchbacks in the Park east of Nusbaum Cut (A-Cut).

Water will become a major constraint again if visitation continues to climb and if the development of the new Visitor Center and Park Entrance facility becomes a reality. If the communities of Cortez and Mancos increase substantially in size, they could compete with the Park for water. Droughts could decrease the amount of water from the West Fork of the Mancos River, and the Park is only allowed a certain amount of water from Jackson Gulch Reservoir. The Park could be forced to look again for other means of obtaining water. History seems to repeat itself.

Management Organization for Phase III

Phase III of the Mesa Verde Waterline Replacement Project was an organizational task of some magnitude. There was an administrative organization for the Project as a whole. There was a field and laboratory organization in large part associated with the archeological work. There was the consulting support organization for the archeological and natural resource studies. And finally there was the contractor and subcontractor organization.

Administrative Organization of Phase III

The Mesa Verde Waterline Replacement Project, Phase III, was administered by the National Park Service Rocky Mountain Regional Office located in Denver, Colorado. Personnel from the regional office responsible for overseeing the project included Clinton Smith, Chief of the Utilities Branch of Maintenance and Construction; Phil Ayers, Environmental Engineer; and Adrienne Anderson, Regional Archeologist.

The National Park Service's Denver Service Center (NPS DSC) was the principal construction lead for the project. NPS DSC's representatives included Ken Raithel, Central Design Team Manager; Glenda Catanach, Contract Administrator; John Ballard, Technical Construction Engineer; Jim Holland, Section Chief; Ron Volz, Project Supervisor; and Dan Pearson, Project Supervisor.

Initially, the administrative representatives for Mesa Verde National Park were Robert Heyder, Superintendent; Ron Mallory, Chief of Maintenance; Robert Bangs, Buildings and Utilities foreman; and Jack Smith, Chief of Research and Resource Management. During the Project, the positions of Mesa Verde National Park's Superintendent, Chief of Maintenance, and Chief of Research and Resource Management changed hands several times. Robert Heyder retired, and Terry Gess became Acting Superintendent until Larry Wiese became the new Superintendent in November 1993. Within the Division of Maintenance, Ron Mallory was replaced temporarily by Bob Bangs until Rick Shireman became the new Chief of Maintenance of Mesa Verde in March 1994.

Within the Division of Research and Resource Management, Jack Smith retired as division chief and was replaced by Gary Matlock. Steve Chomko of the Interagency Archeological Service replaced Matlock temporarily until Linda Towle became the new Division Chief of Research and Resource Management and Principal Investigator for the Mesa Verde Waterline Replacement Project, Phase III in June 1992.

The ultimate authority and responsibility for the cultural resources for the Mesa Verde Waterline Replacement Project, Phase III, rested on the Chief of Research and Resource Management and Principal Investigator, Linda Towle. The role of the Principal Investigator was to design, plan, and implement all aspects of the waterline project activities which would meet the directives of the National Park Service Rocky Mountain Regional Office, Denver Service Center (NPS DSC), Bureau of Land Management (BLM), Midwest Archeological Center (MWAC), Gonzales Construction Company, private landowners, and Mesa Verde National Park. The Principal Investigator provided the primary input on administrative and technical matters.

A Supervisory Waterline Archeologist, Gay Ives, served under the Principal Investigator starting in 1992. Her duties included coordinating and directly supervising the day to day field operations for monitoring construction activities; providing a liaison among all of the federal agencies involved with the project, the contractor, and private landowners; coordinating the field surveys and excavations; organizing laboratory procedures; and report writing. Under the Supervisory Waterline Archeologist, the Excavation Crew Chief for the Waterline Project, Joel Brisbin, was responsible for assuring that the excavations followed the procedures outlined in the various project treatment plans. The Crew Chief supervised the crew's day to day activities, field equipment, and report writing.

The Park also worked closely with the USDI Bureau of Land Management (BLM), San Juan Resource Area Office, Durango, Colorado because the pipeline corridor crossed lands administered by BLM along the North Escarpment of the Park and along Chicken Creek, north of Mancos, Colorado. The administrative representatives for the BLM were Sally Wisely, Area Manager; Mark Hollis, Multi Resource Staff Chief; Kristie Arrington, Area Archeologist; Leon Lujan, Area Archeologist; and Katherine Bulinski, Reality Specialist.

Field and Laboratory Organization of Phase III

At the start of the Waterline Replacement Project, Phase III, the Park did not have the archeological staff to mount a major survey and excavation program outside the Park boundaries. Therefore, the National Park Service Regional Office contracted locally with Flint Research Associates, Cortez, Colorado for survey work on the private land portions of the pipeline corridor and access roads. BLM archeologist, Kristie Arrington, surveyed affected BLM Lands in the Montezuma Valley immediately north of Mesa Verde. Other cultural resource surveys and testing of sites located outside of the Park boundaries were conducted by the Midwest Archeological Center (MWAC), Lincoln, Nebraska. The MWAC work was administered by Douglas Scott, Division Chief for Rocky Mountain Research Midwest Archeological Center. Steve Dominguez was Field Director with Dennis Danielson, Assistant Field Director; Patricia Flint, Assistant Field Director; crew members: Karen Archey, Gina Dikeman, John Greene, Ralph Hartley, Rebecca Hill, Amie Koch, Alan Osborn, Lillian Pollock, Hillary Purfield, Alan Smith, Scott Stadler, Paul Stormberg, Ann Vawser, Liz Wallner, and Colleen Winchell, and volunteers Ann Burkhalter and Sandy Karhu. In addition to the MWAC crew, the Mesa Verde Stabilization Crew assisted in the excavations. The stabilization crew, led by Kathy Fiero, included Raymond Begay, Willy Begay, Key Charlie John, Mark Johannsen, and Gene Trujillo.

When construction on Phase III began in 1992, Mesa Verde National Park hired one additional archeologist to monitor construction activities. However, as the construction escalated, it became necessary to expand the staff to seven monitoring archeologists to cover all construction activities and crews. These archeologists were Gay Ives, Supervisory Waterline Archeologist (1992-1995); Joel Brisbin, Excavation Crew Chief (1992-1995); Earl Mead (1992); Greg Fox (1992); Janet Weeth (1992-1993); Dana Robinson (1992-1994); and Bill Matthews (1992-1994). A waterline clerk, Anita Vialpando (1992-1993), was also hired to assist with the volume of paper work. She was followed by Karl Schaffenburg (1993). Once the construction of the waterline project was completed in 1993, the monitoring staff worked as the excavation crew. In 1993, three additional excavation crew members were hired: Cynthia Williams (1993-1995), Bill Dale (1993-1994), and Julie Bell, Archeological Technician (1993-1995). Marjane Ambler was hired as the Waterline Project Editor (1994-1995) followed by Patricia Flint (1995-1997). Additional Park employees assisted in the monitoring aspects of the waterline construction in 1992. These individuals were Kathy Fiero, Stabilization Archeologist; Art Hutchinson, Park Ranger; and Aaron Kaye, Seasonal Park Ranger. Without their help on various occasions, monitoring would have caused construction delays.

The Mesa Verde Research Center staff assisted the waterline staff throughout the Project. The waterline staff could not have functioned without the help of Margie Pruitt, Division Secretary; Elizabeth Bauer, Curator; Marilyn Colyer, Park Ranger Naturalist; and Pat Oppelt, Volunteer in the Park.

A temporary field laboratory was established in the Mesa Verde Stabilization Building for the archeological portion of the Mesa Verde Waterline Replacement Project. A temporary office trailer was placed next to the Stabilization Building to provide office space for the archeologists. All survey and excavation materials recovered by the Park personnel were processed in the Stabilization Building. The entire archeology crew, in some form or another, was involved in the laboratory processing of materials.

Finally, in the field, the pipeline inspection was directed by the Denver Service Center, during which the Chief Inspector or Project Supervisor changed several times. The first Chief Inspector was Dan Pearson, who retired from DSC. The second was Ron Volz who was replaced by Jack O'Neal in May of 1992. Other DSC inspectors included Luis Sierra, Sheila Henderson, and Jerry Burgess. Student summer help consisted of Parker Young, Brett Chance, and Cornell Gordon. Frank Smith was the Chief Inspector for the new Water Treatment Plant (Phase I), and he assisted during Phase III construction when the Water Treatment Plant was not on line.

Support Organization for Phase III

During Mesa Verde Waterline Replacement Project, Phase III, a number of consultants were involved in specific tasks and specialized studies associated with the archeological research. These include the following organizations and specialists: University of Nebraska, Department of Agronomy Soil Testing Service, (Kenneth Frank, Director of Soil and Plant Analytical Laboratory - Soil Analysis); Alpine Archaeological Consultants, Inc., Montrose, Colorado, (Jonathon Horn - Historic Artifact Analysis); Soil Conservation Service, Cortez, Colorado, (Doug Ramsey and Jonathan Hooper - Geology and Soils Studies); Mariah Associates, Inc., Albuquerque, New Mexico, (Lori Rhodes - Pollen Analysis); Museum of New Mexico, Office of Archaeological Studies, (Dean Wilson and Eric Blinman - Kiln Ceramic Analysis); Flint Research Associates Archaeological Investigators, Cortez, Colorado, (Patricia Robins Flint - Ceramic Analysis), San Juan College, Cultural Resources Management Program, Farmington, New Mexico, (Meredith Matthews - Archaeobotanical Analysis); University of Arizona, Laboratory of Tree-Ring Research, Tucson, Arizona, (Jeffrey Dean - Dendrochronology Analysis); Alpine Archaeological Consultants, Inc., Montrose, Colorado, (Ron Rood - Faunal Analysis); Kay Barnett, Cortez, Colorado, (Archeomagnetic Investigations), Mesa Verde Research Center, Mesa Verde National Park, (Mary Griffiths - Geology and Paleontological Studies), Swink Arts, Bayfield, Colorado, (Clink Swink - Prehistoric Ceramic Replication and Kiln Specialist), and Archaeological Investigations Northwest, Inc., Portland, Oregon, (Shirley Barr Williams, Senior Blood Residue Technician - Blood Residue Analysis).

Contractor and Subcontractor Organization

The contract for Phase III of the Mesa Verde Waterline Replacement Project was completed by Gonzales Construction Company, owned by Frankie Gonzales, and by their subcontractor, Mountain Gravel, owned by Richard Tibbits. Both companies are headquartered in Dolores, Colorado. Field operations were directed by Starling Proffit and Vic Hodges. The companies were housed in one building with combined personnel and equipment. Field foremen included Mike Zion, Rick Linteese, Jeff Bran, and Eddy Goodall.

Summary

This overview of the Mesa Verde Waterline Replacement Project has included the history of the utilization of water sources in the Mesa Verde National Park area from 1888-1979 and the details of the four phases of the Project designed to replace the entire water delivery system serving the Park. Phase III of this Project consisted of replacement of major portions of the West Mancos Water Supply System Line and replacement of parts of the water distribution system within developed areas of the Park.

CHAPTER 3
ENVIRONMENTAL CONTEXT

Cynthia L. Williams

The prehistoric and historic human occupation of the Mesa Verde Waterline Replacement Project Area was directly influenced by the environmental context in which that occupation took place. The various climatic, geologic (lithic, edaphic, hydrologic), floral and faunal resources combined to provide the basis for life in the area. As part of the data recovery plan, important aspects of the local and regional environment are discussed in this chapter to provide a better understanding of the land utilization and resource exploitation schemes as they were interpreted through the archaeological mitigation work.

Colorado Plateau

The Mesa Verde Waterline Replacement Project area is located in the central eastern portion of the Colorado Plateau Physiographic Region (Wanek 1959:667). The Colorado Plateau makes up a large portion of the Southwestern United States and is bounded on the east by the Rocky Mountains, on the south by the Mogollon Slope, on the west by the Great Basin, and on the north by the Uinta Mountains (Hunt 1956:3). It is characterized by large flat expanses interrupted by deeply cut canyons and liberally punctuated with erosional badlands. The plateau resulted from massive faulting, folding and uplifting during the Laramide Revolution, which occurred throughout the late Cretaceous and early Tertiary times (Baars 1972). This period of upheaval and subsequent erosion shaped the basic land forms of the Rocky Mountains and the Colorado Plateau.

The main drainage of the Colorado Plateau is the Colorado River, which eventually receives over 90 percent of the Plateau's flowing water (Zarn 1977:7). The great river has tributaries originating in the Rocky Mountains and drainage basins throughout the Southwestern United States. The Colorado River's main tributaries include the Green, Gunnison, Dolores, San Juan, and Little Colorado Rivers. Many of the smaller drainages are intermittent or perennial, losing water to evaporation, seepage and, in modern times, to irrigation of crops and pasture land.

The general environment of the Colorado Plateau is cold temperate, ranging from alpine to sub montane to high desert. The Plateau supports Upper Sonoran and Canadian Transition life zones (Carey: Plate 1, Brown 10). Due to its inland location, with large mountain ranges to the east and west, it has a relatively dry climate. Weather patterns of the high plateau are influenced by rainshadow, and two migrating high pressure systems: the "Pacific High" and the "Bermuda High". The general effect of these pressure systems is to limit spring and early summer precipitation and to create monsoonal systems in the late summer and early fall (Zarn 1977:6). During heavy downpours, very little water is absorbed by the soils, resulting in increased erosion and lower usable moisture than the precipitation figures portray. Also, a common effect of the aridity of the Colorado Plateau is that a large percentage of precipitation evaporates or sublimates before it can be absorbed into the soil.

Due to low humidity, clear skies, and high radiant heat, daily temperatures on the Colorado Plateau often vary as much as 10°C (50°F). This creates a very tenuous agricultural setting, where nighttime freezes can occur any time from mid-September to late May. Southern exposures enjoy higher temperatures, but tend to have shallower soils (Price et al. 1988).

The Mesa Verde Waterline Replacement Project area is located in the drainage system that feeds the San Juan River. Geographically and hydrologically, the project area can be divided into three distinct regions: the Mancos Drainage system, the Montezuma Drainage system and the Mesa Verde Complex. Although the Mesa Verde complex also feeds into the Mancos River, it has a unique hydrological setting that separates it from Mancos Valley proper.

Mancos and Montezuma Valleys

The Mancos and Montezuma Drainage systems are adjacent to one another, divided by the Mesa Verde complex and a ridge, locally called "The Divide", which runs north from the Mesa Verde National Park entrance to Summit Ridge (Figure 3.1). The Mancos Valley drains into the Mancos River, while the Montezuma Valley drains into McElmo Creek, both eventually debouching into the San Juan River. Both valleys were formed in the Mancos Shale Formation with a few erosional outcroppings of the underlying Dakota Sand-

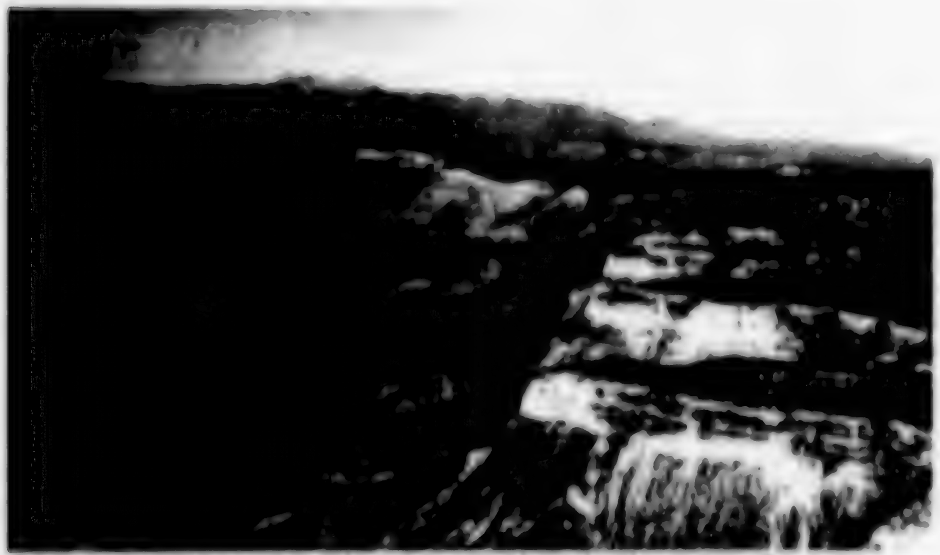


Figure 3.1. Project area looking east towards the intake gallery. Note waterline right-of-way scar in Montezuma Valley in the left center of view.

stone and have similar climates. The main ecological difference between the two valleys is that Mancos Valley's drainage system extends into higher elevations including the La Plata Mountains. The average elevation of the Mancos Valley is 2104 m (6900 ft), whereas Montezuma Valley is situated at about 1890 m (6200 ft). Mancos Valley receives an average of 8-15 cm (3-5 in) more precipitation than Montezuma Valley (NOAA). Table 3.1 provides a climate summary for the area. Most of the water flow in McElmo Creek is return water from irrigated lands of Montezuma Valley (Wanek 1959:672); actual flow comparison between these two drainage systems is difficult due to the human alterations of water flow.

Mesa Verde Complex

The Mesa Verde complex is a system of mesas, cuestas, and canyons sloping gradually southward from an abrupt north escarpment which rises 610 m (2,000 ft) above Montezuma and Mancos Valleys. It has an overall southwest aspect and the mesas are deeply cut by intermittent drainages which feed into the Mancos River to the south (Figure 3.2). Although there are several reliable springs throughout the mesa complex, the downcutting of the canyons results from the erosional force of water during spring runoff and summer thunderstorms, rather than from perennial running streams (Griffitts 1990:68). The orientation of the mesas, the wide range of elevation and tricks of the topography create an intricate pattern of ecosystems, which support a wide range of plant and animal life. The mesas tend to receive more annual precipitation than surrounding areas, usually receiving five to 20.5 cm (two to eight inches) more than Mancos Valley and ten to 23 cm (four to nine inches) more than Montezuma county. Althougn the daytime temperatures on the mesa tops are similar to those in the canyons a unique airflow pattern makes the canyons colder at night. Heat which has built up during the daytime rises, especially under clear skies, causing cold air to drain off the mesas, into the canyons. This air flow situation creates unique vegetation patterns where the typically higher elevation biotic communities exists at lower elevations.

Geology

The rocks which make up the valleys and mesas in our study area are mostly sedimentary and were deposited during the cyclical movements of the great Upper Cretaceous seas, beginning 100 million years ago. The underlying rock is the Dakota Sandstone which was a beach deposit of the earliest Cretaceous Sea. In the study area this formation is only visible in some of the deeper canyons and on a few knobs which have been exposed by erosion. The most prominent exposure of the Dakota Sandstone in the area occurs in McElmo Canyon to the west of Cortez.

Table 3.1 Summary of Temperatures and Precipitation in Cortez, Mancos, and Mesa Verde National Park (MVNP) during the period of 1951-1973

	Mean Daily Max Temperature °C			Mean Daily Min Temperature °C			Mean # of Frost Free Days			Mean Precipitation		
	Cortez	Mancos	MVNP	Cortez	Mancos	MVNP	Cortez	Mancos	MVNP	Cortez	Mancos	MVNP
Jan	5.2		4.7	-9.9		-7.2	1		1	2.49	3.15	4.10
Feb	7.9		6.8	-7.4		-5.6	0		2	1.87	2.95	3.23
Mar	11.5		10.1	-4.5		-3.4	4		6	2.38	4.59	3.51
Apr	17.0		15.8	-0.0		0.3	11		16	2.49	2.92	3.26
May	22.8		21.9	1.8		5.8	26		28	2.41	3.54	2.43
June	28.5		27.9	6.3		10.8	30		30	1.15	1.97	1.82
July	31.8		30.8	12.7		14.3	31		31	2.90	5.74	4.92
Aug	30.1		29.2	11.9		13.3	31		31	4.26	5.49	5.74
Sep	26.2		25.5	7.0		9.8	29		30	2.92	4.54	3.05
Oct	19.8		18.8	1.4		4.3	18		26	3.95	4.23	4.82
Nov	11.3		10.2	-5.0		-2.1	4		9	2.28	3.70	3.38
Dec	5.4		4.9	-9.3		-6.4	1		1	3.15	3.46	4.90
Annual	18.1		17.2	0.8		2.8	187		212	32.26	46.41	45.18

Data based on Climatological Summary provided by the National Climatic Center, NOAA, Asheville, NC., except Mancos data, which was derived from the Mesa Verde National Park Natural Resources climatological files.

Figure 3.2. Aerial view of Mesa Verde Complex, Wetherill Mesa and Long Mesa in foreground, looking southward towards the Mancos River.

As the early Upper Cretaceous shoreline inched southwestward, the deeper ocean deposited finely sorted muds and silts that make up the Mancos Shale Formation. This complex depositional period lasted ten million years, creating beds of shales, limestones and shaley sands up to two thousand feet thick (Griffitts 1990:42). The Mancos Shale is the formation through which most of the Montezuma Valley and Mancos Valley drainage systems flow.

As the great Cretaceous sea retreated eastward, about 81 million years ago, the sediments of the Mesa Verde Group were deposited (Griffitts 1990:5). The three formations that make up the Mesa Verde Group were deposited in a relatively brief 3 million year period and are about half the thickness of the Mancos Formation (Griffitts 1990:62). During this time, the sea continued its fluctuating regressional and transgressional pattern. The Mesa Verde Group is comprised of three distinct formations, the Point Lookout Sandstone, the Menefee and the Cliff House Sandstone.

The transition from Mancos Shale to Point Lookout Sandstone indicates a gradual change from shaly deep sea deposits to more massive sandy beach deposits. The prominent sentinel rock, known as Point Lookout, which marks the entrance to the Park, is the most striking exposure of the Point Lookout Sandstone. The gradual withdrawl of the sea, which was the setting for this deposit, is represented by the interfingering of shales and sandstones at the contact between the Point Lookout and Mancos Formations. The Point Lookout Formation consists of a 17 to 29 m (56 to 94 ft) thick lower sandstone and shale member and an upper massive sandstone member, which measures up to 86 m (283 ft) thick in the Mesa Verde area (Wanek 1959:687-8). It is exposed on the North and East Escarpments of Mesa Verde, but dips below the surface to the south.

As the sea receded further north and eastward, it left behind swamps and bogs which supported a very fertile inland environment. This began the continental deposits of the Menefee Formation. This formation is a combination of shales, thin bedded sandstones, coal, and bentonite. The organic materials left fossil impressions and coal beds. Large sections of cross-bedded sandstone are exposed in some of the roadcuts within the Park. These were deposited by large broad streams whose irregular bottom shapes can be easily identified in the roadcuts along the North Escarpment of Mesa Verde. The presence of bentonite indicates that there was some volcanic activity during Menefee times. (Griffitts 1990:56-7)

Interrupting this rich continental environment, the sea again pushed its way southwestward and deposited another layer of beach sands. This deposit is the Cliff House Sandstone. This formation can be seen along the rims of southward trending canyons. The Cliff House Formation is composed of two distinct layers of sandstone, divided by a narrow band of sandy shales. The quality of the contact between the soft, yet impermeable shales and the blocky, permeable Cliff House Sandstone encourages the formation of shallow alcoves. Humans have used these natural alcoves throughout time for habitation and temporary shelter.

The depositional activity of Upper Cretaceous seas continued for 2 million years beyond the deposition of the Cliff House Formation. The Lewis, Pictured Cliffs, Fruitland and Kirtland formations are still extant in New Mexico, but have been eroded away from the Mesa Verde area (Griffitts 1990:64). After the final retreat of the Cretaceous seas, the great distrophic movements of the Laramide Revolution altered the landscape of the Colorado Plateau. This is when the landscape began to take on the shapes that we see today (Baars 1972:208).

As the Laramide Revolution ran its course, the erosional forces matched the forces of uplift to create vast level plains, wearing mountains down to fill the valleys with sediment. (Griffitts 1990: 64-65). Volcanic intrusions pushed up the sedimentary rocks to form the many laccolithic mountains throughout the area. The project area is surrounded by these laccolithic intrusions, including La Plata Mountains, Ute Mountain, Rico Mountains and Carizzo Mountains (Wanek 1959: 670). As the Tertiary clock ticked on, further volcanic activity forced igneous plugs and dikes up through the remaining Cretaceous sediments. Several igneous dikes have been identified in Mesa Verde and surrounding valleys. These intrusions are composed largely of a rock known as minette (Wanek 1959: 701).

During the past two to three million years, early Quaternary times, this region has undergone several more uplifts, creating active erosional environments (Griffitts 1990: 68). Glacial streams of the Quaternary "ice ages" moved large amounts of sediments, glacial boulders and gravels to this area west of the Rocky Mountains (Griffitts 1990: 68). Ongoing erosional activity continues to shape the land, leaving large amounts of colluvium along the slopes of the Mesas, and alluvium in the streambeds and canyon bottoms (Wanek 1959:700).

Paleontology

The portion of the Mancos and Montezuma Valleys in which the Mesa Verde Waterline Replacement Project study area lies is within the Mancos Shale Formation. Fossil content defines the time periods during which sediments were deposited. There are several distinct members of the Mancos Formation which have been identified in our study area by Park Geologist, Dr. Mary Griffitts. These are in the Greenhorn Limestone and the Juana Lopez calcarenites. The Juana Lopez is actually a faunal zone contained within the Carlile member of the Mancos Formation.

Fossils found during the course of this project complimented existing data related to the local age of the Greenhorn and Juana Lopez units (Table 3.2). A layer of bentonite which overlies the *Mytiloides* rich limestone bed has been correlated with a widespread bentonite which has been dated by Potassium Argon (K-Ar) isotope analysis to 89.2 million years old. (Elder 1988) This finding dates the Greenhorn member to slightly older than 89.2 million years. This particular bluish grey limestone is visible from the base of Mesa Verde North Escarpment north to Dolores and west to Dove Creek. It forms erosionally resistant caps on the tops of small hills and knolls. (Griffitts 1982: 6). The Juana Lopez Faunal Zone dates to about 86 million years ago. This rust colored fossiliferous calcarenite caps mesas and ridges near the Mesa Verde Park Entrance (Griffitts 1982:8).

Soils

The soils transected by the Mesa Verde Waterline can be generalized into three groups: alluvial and colluvial deposits; steep slope colluvium and residual hills; and stable eolian mesa top deposits. Slight variations

Table 3.2. Documented Fossils within the Project Area

Group Genus spp.	Location of Specimen	Geologic Context
Bivalvia		
Mytiloides subhercynicus (Seitz)	Chicken Cr.	Greenhorn Member of Mancos Fm.
M. labiatus (Schlotheim)	Chicken Cr.	Greenhorn Member of Mancos Fm.
M. subhercynicus transiens (Seitz)	Chicken Cr.	Greenhorn Member of Mancos Fm.
M. (Mantell)	Chicken Cr.	Greenhorn Member of Mancos Fm.
M. arcuata (Seitz)	Chicken Cr.	Greenhorn Member of Mancos Fm.
M. cf hercynicus (Petrascheck)	Chicken Cr.	Greenhorn Member of Mancos Fm.
Lopha lugubris (Conrad)	5MT11732	Juana Lopez M[illegible] Mancos Fm.
Pycnodonta newberry's (Stanton)	5MT11796	Juana Lopez Member of Mancos Fm.
Ammonite		
Scaphites sp.	Chicken Cr.	Greenhorn Member of Mancos Fm.
Scaphites impedicostatus (Cobban)	Chicken Cr.	Greenhorn Member of Mancos Fm.
Vertebrata / Vertebrata-Chrondrichthyes		
Osteichthyes sp. (fish scales)	Chicken Cr.	Greenhorn Member of Mancos Fm.
Cretoxyrhyinus sp. (fish teeth)	Chicken Cr.	Greenhorn Member of Mancos Fm.
Ptychodus whipplei	5MT11732	Juana Lopez Member of Mancos Fm.

due to slope, aspect, elevation and erosional status have been detailed by the Soil Conservation Services office in Cortez (Appendix A).

The soils in the Mancos Valley are derived mostly from Mancos shale through alluvial and colluvial processes. This area is composed of mesa tops and ridge tops whose erosional deposits form alluvial fans and terraces. Gently sloped mesa tops and ridges located near the La Plata Mountains' erosional deposits tend to have loamy soils composed primarily of residuum and eolian materials. At slightly lower elevations the eolian soils decrease except on northern or eastern facing hillslopes and canyon slopes. This is due to the leeward effect of the dominant southwesterly winds carrying silts and fine sands. The source of these windborne sediments is probably a combination of Utah and Arizona sandstones and San Juan River alluvium (Price et al.:452-454).

Where the waterline right of way approaches highway 160 near the Park entrance, the canyons are more steeply cut into the mesas and colluvial fingers, which remain from the mesa complex. Throughout this area the soils are mainly combinations of silty clay loam (Sideshow) in the lower, less steep areas (3-25% slopes), and channery clay loam (Zigzag) on the steeper (25-65%) slopes and on the tops of knolls. The silty clay loam is derived from alluvium; and the channery clay loam derives from channery, gravelly residuum, and colluvium. Due to the high shrink / swell potential of these soils they become extremely soft and slippery when wet.

Montezuma Valley soils are similar to Mancos Valley soils. The lower areas of the valley are generally clay loams and silty clay loams of alluvial and colluvial sediments from mixed Cretaceous parent materials. Remnant, erosionally resistant, colluvial capped hills of Point Lookout parent material also occur in this area.

Near the North Escarpment, variations of these soils interfinger with soils derived from the Mesa Verde Complex's erosional processes. The North Escarpment of Mesa Verde is very stony soil formed in colluvium and residuum derived from mixed sandstone and shale parent materials(Sheek-Archuleta-Rock outcrop). The slopes are very steep (20-80%) with a predominantly northern aspect.

Two other soil types exist in the area below the north escarpment of Mesa Verde. They are the "Z" zones, which occur in the ustic torriothents-gullies land complexes, and the "BD" zones, which occur in the torrirthents-badlands complex. The "Z" soils are derived from mixed sources of sedimentary rocks and occur in alluvial fans, drainageways, flood plains, terraces and escarpments. The "BD" zone exists on 25-100% slopes and is comprised of mostly bedrock with some colluvium and residuum scattered throughout.

Within the Mesa Verde Complex, the mesa top soils are mostly reddish hued silt loams. They are derived from eolian deposits carried from Utah and Arizona sandstones and San Juan River alluvium (Price, et al: 452-454). These soils are moderately deep to very deep and date to the Pleistocene epoch (about 16,000 years old) (Price et al.; Ramsey and Hooper 1995a). Near the mesa edges the soil becomes more shallow and Cliff House sandstone bedrock is exposed in areas. This soil is classified as the Arabrab-Longburn complex and the Longburn-Rock outcrop complex. In the canyon bottoms, the soils are almost entirely colluvial sandy loams and loamy sands derived from mixed Cliff House and Menefee parent materials.

Flora

The project area lies within the Upper Sonoran biogeographic province and transects several biotic zones. The native plant communities in the Mancos and Montezuma Valleys are a combination of Great Basin Conifer woodland (pinyon-juniper woodland) and Great Basin Desert Scrubland (saltbrush/ sagebrush flats) (Brown 1982a: 52). However, many years of use as pasture and open grazing have created a dysclimax over a large portion of the study area, altering the dominant plant types to common disturbance species and exotics. The North escarpment of the Mesa Verde Complex consists predominantly of Great Basin Montane Scrubland (gambel oak/ serviceberry)(Brown 1982b). This gambel oak/ serviceberry complex persists along the southern exposure of the mesas and into the heads of the canyons until it gives way to a Great Basin Conifer Woodland as the Mesa tops decrease in elevation.

The intermingling of Great Basin Conifer Woodland and Desert Scrubland in the Mancos and Montezuma Valleys is related to elevation and edaphic conditions.

Where the soils consist of various proportions of alluvium (Sideshow) and residuum and colluvium (Zigzag), the fingers of the different soil types are marked by the variations in plant communities. The steeper slopes and remnant colluvial ridges are colonized by the Conifer Woodland, while the lesser sloped alluvial fans, and bottomlands support Desert Scrubland communities.

The Mancos and Montezuma valley Pinyon-Juniper communities' dominant tree species are *Pinus edulus* (pinyon pine) and *Juniperus utahensis* (Utah juniper). The understory consists of native and exotic shrubs, forbes, grasses and cacti; including *Artemisia tridentata* (big sagebrush), *Amelanchier alnifolia* (serviceberry), *Cercocarpus spp.* (mountain mohagany), *Sarcobatus spp.* (greasewood), *Lepidium spp.* (pepperweed), *Verbascum thapsus* (mullein), *Chrysothamnus nauseosus* (rubber rabbit brush), *Castilleja chromosa* (desert Indian paintbrush), *Xanthocephalum sarothrae* (snakeweed), *Oryzopsis hymenoides* (Indian ricegrass), *Bromus tectorum* (cheatgrass), *Eriogonum heracleoides* (wild buckwheat), *Yucca baccata* (broad-leafed yucca), and *Oppuntia sp.* (prickly pear cactus).

The Desert Scrubland communities represented in these valleys are dominated by *Artemisia tridentata* (big sagebrush), *Atriplex canescens* (four-winged saltbrush), *Chrysothamnus nauseosus* (rubber rabbitbrush), *Sarcobatus spp.* (greasewood), *Oryzopsis hymenoides* (Indian ricegrass), *Agropyron smithii* (western wheatgrass), *Gutierrezia sarothrae* (snakeweed), *Cirsium arvense* (Canada thistle), *Ephedra spp.* (Mormon tea), *Helianthus annuus* (common sunflower), and *Opuntia sp.* (prickly pear cactus).

Below the North Escarpment of Mesa Verde, several edaphically related variaions of these communities exist. The "Z" soil types support sparse plant communities comprised of *Salsola iberica* (Russian thistle), desert grasses, *Artemisia tridentata* (big sagebrush) and annual weeds. The bedrock areas ("BD" zones) are 85% unvegetated, supporting only occasional *Pinus edulus* (pinyon pine), *Juniperus utahensis* (Utah juniper), *Amelanchier alnifolia* (serviceberry), *Cowania mexicana stansburiana* (cliffrose), desert grasses and cacti (SCS Soils data, 1995).

The North Escarpment of Mesa Verde hosts a Great Basin Montane Scrubland community. This community is dominated by *Quercus gambelii* (Gambel's oak), and *Amelanchier alnifolia* (serviceberry). It also supports stands of *Pseudotsuga menziesii* (Douglas fir), *Pinus ponderosa* (ponderosa pine), and occasional *Populus tremuloides* (quaking aspen). Shrubs, forbs and grasses common to these areas include *Achillea millefolium* (western yarrow), *Lupinus spp.* (lupine), *Eriogonum spp.* (buckwheat), *Penstemon spp.* (penstemon).

The varied topography of the Mesa Verde complex provides a wide range of micro-environments and equally varied plant and animal communities. The mesa tops and canyon heads along the northern edge of the mesa complex continue to support the Great Basin Montane scrubland communities. Various exposures within each canyon provide specific conditions favorable to different species. Some of the small, steep cliffs with northern or eastern exposures have thriving communities of *Populus tremuloides* (quaking aspen). Despite seemingly warm daytime temperatures, the cold air drainage effect within the canyons allows the *Quercus gambelii* (oakbrush), *Pinus ponderosa* (ponderosa pines), and *Psuedotsuga menziesii* (Douglas fir) to thrive at lower elevations than would normally be expected. Most canyon bottoms are populated by sagebrush and four-winged saltbrush due to the sandy nature of the soils.

Further south along the mesas, at lower elevations, the characteristic plant community changes to the Great Basin Conifer Woodland. Subtle understory variations due to topography, elevation, and soils can be identified, but a list of prominent species provides an adequate representation of the overall biotic zone. The plant species in the Mesa complex vary slightly from those listed for Pinyon-Juniper woodland of the Mancos and Montezuma valleys mostly because domestic livestock have not been in the Park since 1928. The most common plant species include *Pinus edulus* (pinyon pine), *Juniperus utahensis* (Utah juniper), *Amelanchier alnifolia* (Utah serviceberry), *Cercocarpus spp.* (mountain mohagany), *Purshia tridentata* (antelope bitterbrush), *Fendlera rupicola* (cliff fendlerbush), *Verbascum thapsus* (mullein), *Chrysothamnus nauseosus* (rubber rabbit brush), *Castilleja chromosa* (desert Indian paintbrush), *Gutierrezia sarothrae* (snakeweed), *Oryzopsis hymenoides* (indian ricegrass), *Eriogonum heracleoides* (wild buckwheat), and *Yucca baccata* (broad-leafed yucca).

Fauna

The distribution of wildlife throughout the Mesa Verde Waterline Replacement Project study area is affected by land use, floral communities, and seasonal migration patterns. Since most species make use of multiple biotic zones, a general summary of dominant species is applicable throughout the region. Large mammals common to the area tend to migrate seasonally altering population densities between higher and lower elevations, but are present throughout the region year round. Among these larger mammals are *Odocoileus hemionus* (mule deer), *Cervus elaphus* (elk), *Ursus americanus* (black bear), *Felis concolor* (mountain lion), and *Canis latrans* (coyote). Small carnivorous mammals can often be found in the more open fields, but are known to exist throughout the various biotic zones. These smaller mammals of prey include *Lynx rufus* (bobcat), *Vulpes vulpes* (red fox), *Urocyon cinereoargenteus* (gray fox), *Bassariscus astutus* (ringtail), and *Mustela frenata* (long-tailed weasel).

Small mammals and rodents make up the food supply for these carnivorous animals. The small mammals and rodents in turn make their living from nuts, fruits and seeds of the various plant species in the area. Some common foragers include *Peromyscus maniculatus* (deer mouse), *P. truei* (pinyon mouse), *Eutamias minimus* (chipmunk), *Spermophilus variegatus* (rock squirrel), *Sylvilagus audubonii* (desert cottontail), and *Lepus americanus* (jackrabbit).

Birds which inhabit the area either seasonally or year round include *Meleagris mexicana* (wild turkey), *Branta canadensis* (Canada goose), *Corvus corax* (crow), *C. brachyrhynchos* (raven), *Cyanocitta stelleri* (Stellar's jay), *Gymnorhinus cyanocephalus* (pinyon jay), *Sialia currucoides* (mountain bluebird), *Colaptes cafer* (common flicker), *Pipilo erythrophthalmus* (rufus-sided towhee), *Falco sparverius* (American kestrel), *Buteo jamaicensis* (red-tailed hawk), *Cathartes aura* (turkey vulture), *Haliaeetus leucocephalus* (bald eagle), *Aquila chrysaetos* (golden eagle)

Some of the reptiles found throughout the area include *Crotaphytus collaris* (collard lizard), *Uta spp.* (side-blotched lizards), *sceloporus undulatus* (fence lizards), *Cnemidophorus tigris septentrionalis* (northern whiptail), *Masticophis taeniatus taeniatus* (desert striped whiptail), *Pituophis melanoleucus* (gopher snake), *Crotalus viridis* (western rattlesnake), and *Ambystome tigrinum* (tiger salamander).

Summary

The environment within the project area is varied, thus providing ample natural resource upon which to base a living. Raw materials are readily available for the manufacture of a variety of tools and domestic implements. The climate, although marginal, is favorable for specific cultigens and a wide range of native vegetation which could be exploited for food, medicine, fuel, and construction materials. Large and small mammals round out the supply of resources for food, tools and clothing.

The local geologic setting provides useful materials which have been exploited by humans throughout time. Fine to coarse grained sedimentary rocks were used for hunting and processing tools, such as projectile points, blades, hammerstones, scrapers, manos, and metates. Igneous rocks found in the La Plata and Ute Mountains and in streambed deposits throughout the valleys were available for lithic tools, such as axes, mauls and projectile points, as well as for use as temper in ceramic production. Good quality clay also occurs naturally within the Mancos and Menefee shales, and within the shaley layers of the Cliffhouse and Dakota Sandstones. Prehistoric and historic settlers in the area relied upon both blocky and tabular sandstones for building materials for their homes and other structures. Prehistoric people took advantage of the alcove forming properties of the local sandstone formations for dwelling places and temporary shelters.

The climate is rather marginal for large scale farming, but knowledge of micro-climates and hydrological control have allowed humans to create successful agricultural landscapes. The varied elevations throughout the Mancos Valley, Montezuma Valley and Mesa Verde provide for a wide range of flora and fauna upon which humans have relied.

Native flora abounds with resources for food, medicine and fuel. The larger trees, such as pinyon, juniper, Douglas fir and ponderosa pine were used extensively for fuel and construction materials. Seeds, leaves, fruit, and roots of native plants, such as yucca, rice grass, serviceberry, prickly pear and Mormon tea were important for medicinal and nutritional values. Plant fibers were also usd for weaving, twining and other houshold purposes.

The range of large and small mammals, birds and reptiles has provided for many human needs. Bones were used to make tools, such as awls, drills, needles and scrapers. Hides and feathers were used for clothing, blankets, and as ceremonial items. Protein and fat values were derived by consuming animal meat.

The raw materials and climate in and around the project area has supported small hunting and gathering populations, as well as larger, more settled agricultural populations. Although in any given year the growing season may be too short, or the rains too few, humans have been able to take advantage of the resources of this area for over a thousand years to support various sizes and types of populations.

CHAPTER 4
HISTORICAL OVERVIEW

Julie Bell

Introduction

The historic studies associated with the Mesa Verde Waterline Replacement Project Phase III were focused on developing an historical overview of the Project area to provide the context for understanding the archeological sites which were excavated or tested as part of mitigation work. The first part of this chapter on the general history of southwest Colorado provides pertinent details on the history of Mesa Verde National Park. Nine relevant historic contexts identified for southwest Colorado are discussed : Ute and Euro-American Contact; Spanish Exploration; Fur Trade and American Exploration; The Early Gold Rush; The Railroads; Ranching, Farming, Water, and Irrigation; Federal Activity (Development of Mesa Verde National Park); The Establishment of Early National Park Service (NPS) Administrative Facilities in Mesa Verde National Park, 1921-1931 ; and Depression Era Development at Mesa Verde National Park, 1931-1942 (Husband 1984). The second part of the chapter deals with the six historic districts in Mesa Verde National Park which were impacted by the construction of the Mesa Verde Waterline Replacement Project Phase III. The six historic districts discussed in this chapter are 5MT9790, 5MV3938 and 5MV3939, 5MV3941, 5MV3[illegible] 5MV3991, and 5MV3992. Seven historic sites impacted by construction activities are discussed in a separate chapter on Mesa Verde Segment Testing and excavation: 5MV3942, 5MV3962, 5MV3963, 5MV3964, 5MV3965, 5MV3966, 5MV3973.

The historical development of southwest Colorado was closely tied to the available resources and the ability of early settlers to live with rugged mountains, semiarid flatland, and extreme weather. For many centuries, native populations thrived in lands considered uninhabitable by European standards. Few Europeans ventured into the unknown of Colorado. The mountains appeared impassable and offered many hardships in return for evidently limited resources. Explorers, fur trappers, and miners attempted to penetrate southwestern Colorado, but encounters with unfriendly tribes and hostile terrain usually dissuaded further attempts at colonization. As a result, permanent European settlement in this area was somewhat sporadic and occurred relatively late in the nineteenth century with the advent of commercial mining and associated railroads , ranching, logging, and irrigated agriculture.

Historic Context: Ute and Euro-American Contact

Although southwestern Colorado appeared uninhabitable to early traders, trappers, and explorers, the Native American Ute bands had successfully adapted to Colorado's terrain and natural resources. From the early 1600s until the mid 1800s, historic accounts describe the Ute's use of land which focused on making a living from wild natural resources in the river valleys and highlands of Colorado (Delaney 1989:7-11). The Utes moved with the seasons, following their food sources from the highlands to the valleys. Early spring to late fall were spent in the mountains hunting deer, elk, and other available animals. This was also the time for gathering wild plants, berries, and nuts. Winter was an opportunity for social gatherings, bringing different bands and family units together for a sharing of resources (Delaney 1989:7-11). Evidence of their campsites and activities was left on the land in the study area.

When the Spanish entered Ute territory, they brought along an animal that would forever transform the Ute way of life. In 1626, a Spanish scribe provided the first documented description of Utes when he recorded confronting a mountain Indian tribe he called the "Utahs". By this time, he recorded that the Utes possessed horses, suggesting that these two groups had previous encounters with each other. Another early report depicted a meeting with the Utes which was recorded by a scribe employed by Governor Luis de Rosas of Santa Fe. This was the record of a 1637 battle between the governor's troops and a tribe of mounted Utes. Again in 1659, records described a Ute attack on Spanish ranches in New Mexico. In this conflict, 300 horses were stolen and driven north into the mountains (Marsh 1982:15).

With horses, the Utes were able to expand their hunting grounds and more successfully resist rival groups. Ironically, Spanish horses, acquired through raids and bartering, helped the Utes elude Spanish conquest for many years. While the Spaniards were successful in subjugating Pueblo tribes, the deft horsemanship of the Utes, along with a familiarity of the surrounding mountains, aided their escape from proselytizing missionaries (Marsh 1982:12-24).

Horses also empowered the Utes over other native tribes inhabiting the Southwest. No other tribe endeavored to occupy Ute lands in Colorado. This lack of challenge enabled the Utes to launch raids against other groups, often acquiring goods and capturing enemies for slave trade. Other tribes, as well as explorers, recognized the Utes as effective warriors. As a result, Utes continued their exclusive use of Colorado's natural resources for their hunting and gathering lifeway during the first 200 years of European exploration (Marsh 1982:12-24).

For the Utes of Colorado, the 1700s were a time of territorial expansion. They increased their subsistence base by launching successful raids against the Spanish, often stealing supplies and horses. Different bands of Utes, originally consolidating for economic reasons, continued alliances for their military advantages. This unification of forces resulted in an even stronger Ute presence in Colorado, enabling them to acquire hunting grounds to the south and east. The Spanish, also wishing to increase lands for trading and trapping, strengthened their military power and frequently battled with the Utes. These two groups engaged in warfare on numerous occasions; the Spanish would attempt to subdue the Utes while the Utes raided for horses and provisions (Marsh 1982:26; O'Rourke 1980:46).

Tired of this increased struggle for power, the Spanish arranged treaties with the Utes in an attempt to quell growing animosities. These agreements resulted in more peaceful contacts between the two groups and aided the Rivera and Dominguez-Escalante exploration parties. Both groups noted friendly encounters with the Colorado Utes, and they were often recipients of Ute hospitality and guidance during their travels (Marsh 1982:29-33; O'Rourke 1980:46).

The nineteenth century brought everlasting change to the traditional Ute lifestyle. With the Louisiana Purchase of 1803, trappers, miners, traders, and U.S. Army exploration parties were able to penetrate into the previously Spanish dominated Southwest. Settlers were also permitted to pass through Ute lands on their route west. Some even attempted to homestead on the southern borders of Colorado. Sensing the inherent encroachment of westward-bound Americans, the Utes repeatedly attacked new ranchers in an attempt to maintain the boundaries of their traditional homeland (Marsh 1982:39).

With the end of the Mexican War in 1848, the Spanish government turned over New Mexico and Colorado to U.S. authority. The United States, realizing the strength of the Utes, persuaded leaders to meet at a conference to discuss their lands in Colorado (Marsh 1982:39-43). In December 1849, the Utes signed the historic Treaty of Guadalupe-Hildago which acknowledged the sovereignty of the United States government. Along with peace, the Utes agreed not to stray from their tribal lands without permission. A second aspect of this treaty allowed the U.S. government to establish military agencies within Ute territory (Delaney 1989:30-31). This was the first of many such treaties which would gradually change the Utes traditional lifestyle and diminish their ancestral domain.

Following the terms of the treaty, the first government agency was established at Taos, New Mexico in 1850. Attempting to control Ute movement in western Colorado, agencies were also established on the White River in the northern section of the state, and in the south on the Los Pinos River (Delaney 1989:32; O'Rourke 1980:49). Because no boundaries for Indian lands had been established in the treaty of 1849, friction was mounting between the natives of Colorado and encroaching homesteaders as settlers began yearning for fertile lands within Ute territory. As a result of these conflicts, a second treaty was negotiated.

In 1868, an agreement was arranged between the Utes and the United States government which established a single reservation for all seven Ute bands. This 16 million acre reservation encompassed approximately the western one-third of Colorado. The resulting treaty also established Ouray, leader of the Tabeguaches (Uncompahgre), as the single chief of all Ute bands. The Utes believed that this treaty would secure their new land boundaries and safeguard them from European trespassers (Delaney 1989:32-33). Unfortunately, the government would only honor the terms of this agreement for five years. This was only the beginning of Ute territorial problems.

Shortly after the new treaty was signed, rich minerals were discovered in Colorado's San Juan Mountains.

Miners, who saw a different use for the land in Colorado, soon began violating the agreement of 1868 and intruding on Ute land in their search for rich veins in the Rocky Mountains. Once again, the area occupied by the Utes was in great demand by the government. Negotiations were quickly reestablished, producing the Brunot agreement (or the San Juan Cession) of 1873 which opened four million acres of Ute land in the San Juans for mining. The Ute council, commissioned for this bargaining, recognized the fact that miners would inevitably invade their territory. The government was nearly powerless to prevent such large-scale trespassing. Believing that they were only ceding the mines of the San Juans, the Ute leaders reluctantly agreed to surrender the mountain range to the United States in exchange for monetary compensation. Ultimately, the Utes relinquished nearly four million acres of land, approximately one-fourth of their Colorado domain (Delaney 1989:45-47, Marsh 1982:75).

Although the Utes did sacrifice a large part of their homeland in 1873, they were more successful than most Native American tribes in maintaining their ancestral territory. Other tribes had been forced from their land onto reservations nearly one hundred years earlier. Because of their tenacity and the ruggedness of Colorado, the Utes were able to maintain twelve million acres of their original homeland during the nineteenth century (Marsh 1982:75).

It was not long, however, before infringing foreign settlers sought to use the land of Colorado in a way very different from hunting and gathering. The Euro-Americans wanted to farm as well as mine, and demanded more of the fertile Ute lands. Increasing population, Colorado statehood, and the inevitable mining fury, led to mounting competition for Colorado territory. The citizens of this new state began pressuring Congress for a complete expulsion of Utes from Colorado (Delaney 1989:53). Remarkably, the Utes responded with very little violence toward the new populations attempting to occupy their ancestral lands. Chief Ouray's firm leadership and calm persuasion of his people helped to maintain peace (Marsh 1982:81).

In September of 1879, an unfortunate incident took place which created an uproar against the Utes and solidified support for their removal from Colorado. Known as the "Meeker Massacre", the murder of Agent Nathan Meeker and eight of his employees at the White River Agency, provided the impetus for the Ute expulsion from their native lands (Delaney 1989:52-53; Marsh 1982:87-100).

It was this tragedy which would finally restrict the Utes from hunting and gathering within their native land. With no bargaining power left with which to hold onto their ancestral territory, the Utes were deported to reservation lands in 1880. The northern Ute bands were resettled to barren land east of Salt Lake City in Utah. The southern Utes were confined to a small portion of southern Colorado. The government confiscated all remaining Indian territory. The Utes who had once controlled millions of acres of Colorado's finest hunting grounds, mountains, and valleys, were finally under government control and would forever be restricted to small, semiarid desert plateaus (Marsh 1982:100-103).

Historic Context: Spanish Exploration

The Spanish land use in southwest Colorado focused on exploration and establishing trails and trade. Expeditions by de Vargas in 1694, de Rivera from 1761-1765, and Domingez and Escalante in 1776 contributed greatly to the knowledge of southwest Colorado, describing previously unknown geography, potential resources, and the culture of the native inhabitants. Spanish names were given to prominent landmarks and rivers. The richly narrative Spanish diaries documented the early history of the study area.

One of the earliest extant records of travel into southwest Colorado was compiled by Don Diego de Vargas in 1694. Vargas and his party were on an expedition to procure supplies in northern New Mexico. Attempting to avoid hostile encounters with Pueblo Indians, Vargas detoured farther north into Colorado. While there, the party encountered a band of Utes and invited them back to Santa Fe to trade with the Spaniards (Hafen and Hafen 1954:51-52).

The first comprehensive existing record of exploration through southwest Colorado came nearly seventy years after the Vargas expedition. Responding to rumors of mineral wealth along the San Juan Mountain Range, Governor Cachupin of New Mexico decided to send Juan de Rivera and his party north in search of these rich resources. Rivera conducted three prospecting and trading expeditions through the Rocky Mountains between 1761 and 1765. "The silver-bearing ore he found in a mountain range of southwestern Colorado gave the name to the La Plata (Silver) Mountains" (Hafen and Hafen 1954:52).

The next comprehensive account of exploration through the west described part of the route which became known as the "Old Spanish Trail". Eleven years after Rivera's last expedition, two Franciscan priests, Fray Francisco Atanasio Dominguez, and Fray Silvestre Velez de Escalante led a memorable trek to establish a communication link between the missions of Santa Fe, New Mexico, and those in Monterey, California. Expecting hostilities from Hopi Indians, the party decided to bypass Hopi villages in Arizona and travel instead through Ute country in Colorado (Figure 4.1). This was the first well-documented trip through unchartered Ute territory. The detour chosen followed Rivera's route and established a trail which would be continually utilized by future travelers (O'Rourke 1980:25). Even the modern highway system of U.S. Routes 84 and 160 follows the Old Spanish Trail to connect New Mexico with Colorado (Hafen and Hafen 1954: 61). The Dominguez-Escalante party named the Mancos and Dolores Rivers in the study area and described prehistoric Pueblo ruins near Dolores..

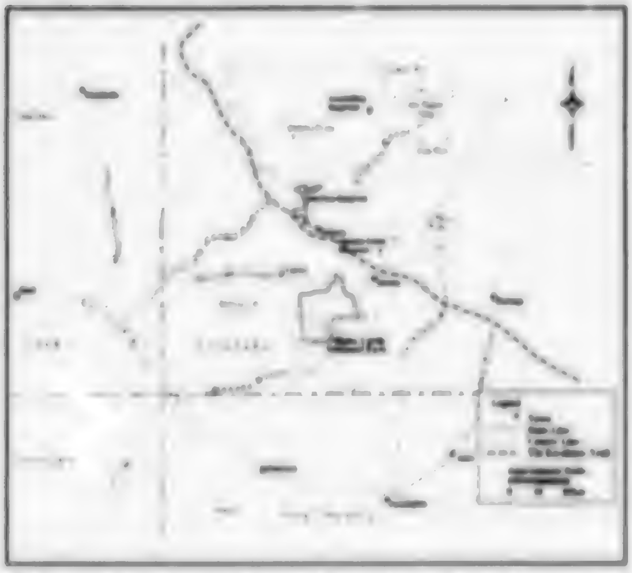


Figure 4.1. Route of Spanish explorers, Dominguez and Escalante, through southwest Colorado, August 6-18, 1776 (Bolton 1972).

Historic Context: The Fur Trade and American Exploration

From 1820-1840, fur trapping was a lucrative enterprise in Colorado. Mountain men were the trailblazers for the Western Expansion; they explored this new frontier ahead of official parties, created trails and access to the riches offered in the west, and opened the area for further commercial development. Although Colorado's fur trade began it's decline in the 1840s, the trappers left a legacy of exploration and trailblazing (O'Rourke 1980:28).

Trappers explored much of the area within twenty years, but had mapped few of the trails and passes they traveled. With American expansionism increasing, the U.S. government became a willing party in further discovery and development. The United States Army Corps of Topographical Engineers was reorganized in 1838 with a special emphasis placed on exploration in the west. With the Mexican War (1846-1848) came further opportunities to explore the Southwest. Army explorers were dispatched to gather new data on this relatively undocumented area (Goetzman 1966:250). As a result, further mapping was accomplished and the current boundaries for the states of Colorado, Utah, and New Mexico were established.

Additional events during 1848 also promoted further investigation of the west: gold was discovered in California, Mormons began migrating to Utah, and agriculture was expanding in Oregon. America's interest in the west was reflected in the demand for wagon roads, railroads, telegraph lines and anything else that would facilitate western expansion. During the next decade (1848-1859), three separate expeditions, lead by John C. Fremont, Captain John Williams Gunnison, and Captain Randolph B. Marcy, attempted to establish a central railroad route along the 38th parallel from Missouri to California. Ultimately, all three campaigns failed to locate a practical railroad passage. It was the rugged wilderness of southwest Colorado's Rocky Mountains which interfered with plans for a central train route (O'Rourke 1980:40, Vandenbusche & Smith 1981:26-27).

In the summer of 1859, one last expedition attempted to navigate a successful passage through southwest Colorado. Captain John C. Macomb of the Topographical Corps searched for a practical northern railroad or wagon route connecting Santa Fe to the west coast. Following the Old Spanish Trail, his party traveled through the San Juan River Valley along the southern edge of the La Plata Mountains. Macomb found the country to be so rugged and the weather so severe that he recommended against constructing any thruway. Along with his three predecessors, Macomb saw little potential for successful navigation through the mountains. Furthermore, these parties could find no reason for residing in such harsh conditions. It would take the payoff of a valuable resource to attract a foreign population willing to withstand Colorado's rough country and extreme weather. Consequently, permanent European settlement in southwest Colorado was again postponed for at least one more decade (O'Rourke 1980:40).

Historic Context: The Early Gold Rush

When valuable minerals were first discovered in the Rocky Mountains in 1858, the famed "Colorado Gold Rush" was launched, helping to shape the future of this very rugged and unspoiled land. From the time of the Brunot Agreement in 1873, the San Juan Region of southwestern Colorado saw rapid development in mining operations and emerging towns established to support this new endeavor. With the removal of the Utes in 1881, southwest Colorado was promoted as a place of great promise. The area was now open for a variety of land uses such as mining, agriculture, livestock, and most significantly, development.

The Spanish had taken advantage of valuable minerals found in the Rocky Mountains during their explorations. Subsequent mining booms in Colorado would continue until early in the twentieth century. As early as 1859, miners were aware of the potential for prospecting in Colorado, but with Utes occupying the heart of the rich vein area, only the most determined prospectors ventured into the territory. Settlements were sparse and very few endured through harsh winters in the mountains (O'Rourke 1980:59-60).

Because of its ephemeral nature and minimal necessary equipment, gold placer was the first mining to take place in the Southwest. Placer mining was accessible to most because it was free and required only a pan, pick and shovel. Many were attracted to this type of mining which promised a quick and easy payoff. Despite the relative ease of placer mining, however, gold prospecting was short-lived.

In the spring of 1861, San Juan prospectors took advantage of the fertile Animas Valley and constructed buildings which would later make up Animas City. Small mining camps were established, but many were deserted after only a few years leaving archeological remains known as ghost towns. The transitory lifestyle of the placer miner caused isolation, lawlessness, and a resistance to urbanization. With the decreasing value of gold, lack of new deposits, and primitive conditions came the decline of placer mining in the 1860s. Silver and hard-rock mining replaced the more risky and increasingly sparse gold prospecting. These new minerals required a more sophisticated operation for their extraction. With these new deposits promising to be more productive than gold, development in southwest Colorado became inevitable (Vandenbusche & Smith 1981:35-45).

Rumors began circulating that the San Juan Mountains held the "mother lode" in minerals. Prospecting parties began moving into the Dolores and Mancos valleys in 1869, seeking quartz and silver. These were seasonal migrations, with miners moving out before the onset of winter (Vandenbusche & Smith 1981:45). The expulsion of the Utes in 1881 enabled full-scale mining operations and permanent Euro-American settlement to finally develop in southwestern Colorado.

With this seemingly steady mining boom, settlement would ultimately endure in Colorado. Towns sprang up throughout the La Plata and San Juan Mountains; Ouray, Lake City, Rico, Telluride, and Silverton were established and quickly grew into thriving communities. These new towns and camps created a need for accessible transportation. Miners, explorers, and trappers had developed trails and roads, but now a more sophisticated shipping and delivery system was necessary (Hafen 1933:208). Without money for roads, Colorado needed another solution to its transportation problem. The industrious Otto Mears welcomed the challenge and became instrumental in the evolution of accessible routes to Colorado's interior.

Historic Context: The Railroads

Hailed as "The Pathfinder of the San Juans", Otto Mears has been credited with the opening of the Western Slope. He realized the necessity of a reliable transportation system to access isolated settlements tucked away in the San Juan Mountains. Mears first built toll roads traversing 300 miles throughout the rugged San Juans and later constructed railroads to serve rapidly developing mining towns (Hafen 1933:208; Ubbelohde et al. 1976:185-186; Vandenbusche & Smith 1981:95). Mears' short railroad lines included the Silverton Railroad, Silverton Northern and the renowned Rio Grande Southern, which connected Durango with Rico (Ubbelohde et. al. 1976:186; Vandenbusche & Smith 1981:95) (Figure 4.2). These rail systems allowed mining camps to evolve into towns and eventually, cities. The Rio Grande Southern route passed through the Mesa Verde Waterline Replacement Phase III Study Area.

With the arrival of a rail system in the 1880s, southwestern Colorado was open to new settlement and enterprises as never before. The beginnings of mining, ranching, and farming have been attributed to the ease of accessibility afforded by the railroad (Vandenbusche & Smith 1981:83-103). Mining had already taken hold in the San Juan region, but now new endeavors necessary to support burgeoning prospecting towns were able to flourish. Because of the availability of fertile lands and the demand for essential provisions, ranching and farming were the logical choices for new enterprises.

Historic Context: Ranching, Farming, Water, and Irrigation

After discovering the Comstock mine in the La Plata Mountains in 1873, four prospectors from California began seeking operational funds. Captain John Moss, a mining camp scout for the wealthy Parrott Bros., expressed interest in their endeavors. With the support of his employers, Moss lead a party from San Francisco to southwestern Colorado in 1874. Following the modern routes of Highways 160 and 666, Moss and his party were guided by the Mancos River and Navajo Wash into an extensive dale. Naming this area the Montezuma Valley, Moss and his party continued on until they reached the Mancos Valley. Finding this valley abundant with resources, seven of the party vowed to settle there once prospecting was concluded. After Moss' group wintered in the Mancos Valley, these seven men established homesteads and became the first Euro-American settlers in the area (Ellis 1976:1-3; Freeman 1958:27-28; O'Rourke 1980:84-85).

The next year John Moss established Parrott City, a short-lived mining camp west of La Plata Canyon, generating a community that would entice future homesteaders to settle in southwestern Colorado. Within ten years, the Rio Grande Southern Railroad connected Durango with Mancos, making expansion inevitable. This area was now open for further commerce, and as the gateway to the Mesa Verde (Freeman 1958:28; Smith 1988:10, 37).

The Mancos River Valley was also attractive to an expansionistic Mormon community. Settled exclu-

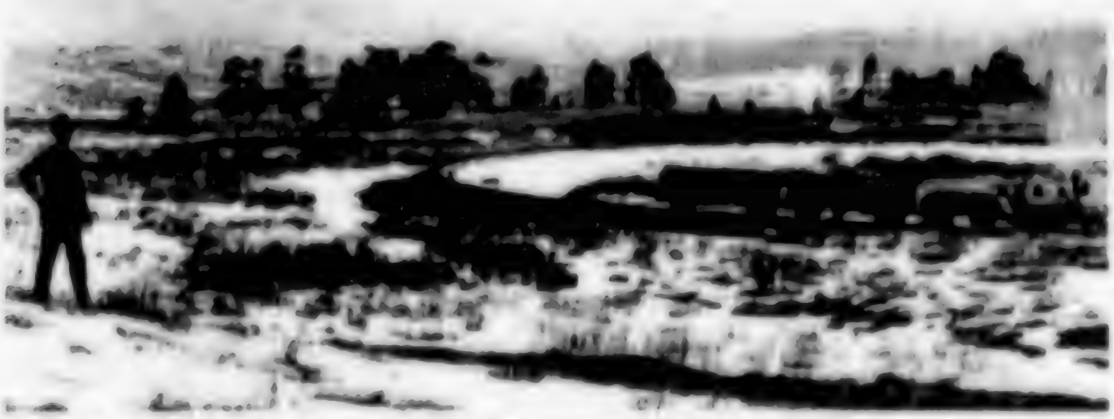


Figure 4.2. Denver and Rio Grande Narrow Gauge Railroad, by Mancos Hill, looking West towards Mesa Verde and Ute Mountain (Mesa Verde National Park Archives, Category #101, Photo #4070, 1915-1925, Mesa Verde National Park, Colorado).

sively by Mormons in 1882, the Weber Canyon community was established when a caravan of eighty wagons traveling from Cedar City, Utah, arrived in the Mancos Valley. Finding prosperous land available south of Mancos and attracted by the agricultural potential of this area, nearly seventy families homesteaded, creating a community that still survives (Freeman 1958:35-42).

While permanent settlement in the Mancos River Valley was taking hold, a similar process was occurring in other areas of southwestern Colorado. In the Dolores River Valley, ranchers quickly recognized the good grazing country available and built homes on the fertile land. By the late 1880s, residents were firmly entrenched in this valley (Freeman 1958:49-52).

Meanwhile, 17 miles west of Mancos, Montezuma Valley's rich land was also enticing settlers. In the 1870s, this area was used for winter grazing range, but with the land's potential for cultivation, farmers rapidly utilized most of the available acreage. By 1881, the first permanent settlers moved in, with many more ranchers and farmers soon to follow (Hafen 1933:227).

Although the valley's fertile soil promised abundant agricultural production, the new settlers soon encountered problems with their yields. Because no reliable streams were present in the Montezuma Valley, farming activities could not be fully exploited. Settlers were able to take advantage of springs for domestic use, but irrigation would be necessary to cultivate the land. The water at Mitchell Springs attracted a relatively large population which built homes near the source. South of present day Cortez, the settlement near this spring first gave rise to a community that would one day grow into the largest city in Montezuma County, Cortez (Freeman 1958:84).

Cortez

Established in 1886, Cortez developed with the building of the Montezuma Valley irrigation system. Before this time, water for residents had to be hauled from Mitchell Springs. Because of this sparsity of water, land in the valley had been utilized primarily for ranching. However, over-grazing quickly depleted even those pastures. With land in Montezuma Valley proving potentially fruitful for agriculture, attention was diverted from predominant ranching activities to the development of an irrigation system able to sustain farming (Freeman 1958:84-85).

Realizing that a more stable water source was necessary, the Montezuma Valley Water Supply Co. took charge designing a township to be the center of irrigation activities, and naming this community Cortez. Water for irrigation was to be diverted from the Dolores River to the Montezuma Valley through a tunnel and distributed by canals and ditches. Once this project was under way, many more families were drawn to the valley and homesteads multiplied rapidly. In 1889 the irrigation system was completed, enabling the town of Cortez to become an agricultural center. Future expansion and progress would produce the sustainable and thriving community which continues to evolve (Freeman 1958:66-68, 96-99; Hafen & Hafen 1949:265-266).

Economic Diversification

Because of its newly discovered and accessible land, southwestern Colorado was beginning to emerge as an economic and populous force. Until 1881, ranching and farming had been support enterprises for mining operations. With the expulsion of the Utes from the Western Slope, coupled with construction of roads and railways, irrigation projects, and permanent settlement, southwestern Colorado was ready to welcome new endeavors. Development of irrigation techniques enabled farmers to exploit the semiarid soil on the Western Slope for fruit-growing. By the mid-1880s, fruit orchards were prospering in the Montezuma Valley. Within ten years, lumber companies discovered the richly forested lands along the San Juan and Dolores Rivers, leading to a new enterprise in timber harvesting. Economic diversification was beginning to emerge in southwestern Colorado (O'Rourke 1980:121-125).

Although these new resources appeared to be abundant, eager entrepreneurs, unaware of their vulnerability, began exploiting the land in the Southwest. Without a full understanding of the nature and sustainability of these resources, farmers, ranchers, and loggers quickly began depleting Colorado's forests, pastures, and agricultural land. In 1891, with concerns about land management prevalent, conservationists introduced legislation designed to control and protect resource use. By the turn of the century, the federal government had created forest reserves and reclamation projects which would forever alter the previously liberal land use practices in southwestern Colorado (O'Rourke 1980:121-143).

Historic Context: Federal Activity: Development of Mesa Verde National Park

The trend toward conservation and increased government control over land management continued into the twentieth century and helped secure protection for prehistoric dwellings found throughout the Four Corners region. The area known today as Mesa Verde National Park was established to ensure preservation for the remains of a prehistoric culture that once thrived in the rugged country of the Southwest.

Made famous by the Wetherill brothers of Mancos in 1888, the archeological treasures of the Mesa Verde area were known by earlier explorers. Reference to ruins was made by members of Rivera's expedition, although there was no specific mention of these ancient cities being found within Mesa Verde. Dominguez and Escalante passed very near this green tableland, but they did not venture into its vast canyons and plateaus. Although this territory intrigued many early explorers, very few attempted to scale the escarpment to discover Mesa Verde's hidden secrets (Smith 1988:7-9).

The first party adventurous enough to climb the mesa was the San Juan Exploring Expedition of 1859. Led by Major John N. Macomb, this army campaign set out to record the geology of the Southwest. Geologist Dr. John S. Newberry ascended the cliffs of Mesa Verde to gain a panoramic view of the valley below and marveled at the vista from the high tablelands: "...no better point of view could possibly be selected than that of the summit of the Mesa Verde." (Macomb & Newberry 1876:85). Newberry also noticed artifacts which he attributed to a "...former occupation by a considerable number of inhabitants" (Macomb & Newberry 1876:86).

Another expedition which ventured into Mesa Verde was that of F.V. Hayden during a geographical survey of Colorado. William Henry Jackson, the famed photographer for the Hayden expedition, encountered a miner from Moss' party who had heard of ruins tucked away in Mancos Canyon. An intrigued Jackson accompanied Captain John Moss into the canyon to photograph the ancient cities: "Our object being to find those in which the picturesque predominated and were the least known, we directed our course to the westward, having obtained reliable information of the existence of some which would come up to our anticipations." (Hayden 1876:369). Jackson prevailed and before nightfall on the first day of his exploration, found a cliff dwelling referred to as Two Story House: "...far up the cliff what appeared to be a house, with a square wall, and apertures indicating two stories..." (Hayden 1876:371). Over the course of two more visits to the Southwest, William Henry Jackson produced some of the earliest and most spectacular photographs of Colorado's abandoned cliff dwellings.

Jackson's photographs and accompanying articles about these ancient ruins stimulated the public's interest and focused national archeological attention on the prehistory of southwestern Colorado. Growing publicity in the 1870s enticed visitors to explore the Mesa Verde region and dig for relics. Local residents took advantage of the expanding tourism, becoming guides and packers, leading parties through Mesa Verde's vast canyons and tablelands searching for ruins and artifacts. The collecting of treasures became prevalent enough to provoke Colorado's first governor, John Routt, to introduce legislation that would help insure the protection and preservation of the ruins. Unfortunately, the state's lawmakers dismissed the governor's concerns and neglected to pass any protective measures. The region known as Mesa Verde remained unprotected for another thirty years, while growing curiosity with prehistoric treasures continued to threaten that which had remained undisturbed for seven centuries (Smith 1988:11-15).

Wetherills and Nordenskiold

Over the next ten years, other explorers ventured into Mesa Verde's canyons to investigate its ancient civilization, but it was one family's earnest curiosity which ultimately unveiled the area's past secrets to national attention. The cattle ranching Wetherill brothers of Mancos, having befriended the Utes, were allowed to graze their cattle on Ute land. The Wetherills had been told by the Utes of the ancient cities nestled among the cliffs of the Mesa Verde. Their curiosity provoked, the brothers searched out and explored some of the smaller ruins. One Ute often spoke of the largest dwelling known, enticing the brothers with stories of a city consisting of over 100 rooms. The Wetherills listened with disbelief, but nonetheless began paying closer attention to the cliffs high above their heads. In 1887, Al Wetherill spotted what he thought to be an immense habitation in a large alcove, but with darkness falling he returned to camp instead of investigating further. The following winter, while searching for lost stock in December of 1888, Richard Wetherill and his brother-in-law, Charlie Mason, spotted Cliff Palace from across the canyon. Along with brothers John, Winslow, and Clayton, the Wetherills went on to explore more canyons and discover dwellings such as Balcony House, Spruce Tree House, and Square Tower House (Hafen & Hafen 1949:34-37; Smith 1988:7-14; Watson 1946:9-14).

For the next few years, the Wetherills investigated the canyons of Mesa Verde for more cliff dwellings and excavated for artifacts (Figure 4.3). Their economic focus had shifted from ranching and farming to the more adventuresome lifestyle of exploration and relic hunting. The brothers kept notes of their diggings and displayed their finds at fairs and expeditions. Awakening the public's interest in prehistory, the Wetherills realized that they could possibly make a living from this new endeavor by selling artifact collections and guiding visitors through the ruins. News of their discoveries quickly spread, especially attracting the attention of Swedish scientist, Gustaf Nordenskiold, who was visiting Colorado for health reasons (Hafen & Hafen 1949:34-37; Smith 1988:22-25).

Figure 4.3. Al Wetherill excavating in Long House (5MV1200), (Mesa Verde N. P. Archives, Category #101, Photo #8468A, 1891, Mesa Verde N. P., CO).

Intrigued by what the Wetherills had found at Mesa Verde, Nordenskiold traveled to Mancos in 1891 to explore first hand the treasures left behind by the prehistoric people. For two months Nordenskiold and the Wetherills explored, excavated, sketched, and photographed the cliff dwellings of Mesa Verde. Although Nordenskiold was not an archeologist, he was a trained scientist and thus, kept very meticulous notes of all of the work conducted in the ruins. Nordenskiold returned home with a collection of artifacts for a museum in Stockholm and, within two years, he published a comprehensive report, *The Cliff Dwellers of the Mesa Verde* (Nordenskiold 1893) detailing the excavations carried out during his stay (Hafen & Hafen 1949:34-37; Smith 1988:22-25).

Although many had explored the ruins of Mesa Verde and gathered artifacts for private collections without incident or reprisal, Nordenskiold encountered opposition to the work he conducted. When he tried to export his assemblage to Sweden, local residents became incensed about Nordenskiold's removal of ancient relics from Colorado's prehistoric sites. Charges were brought against Nordenskiold for looting and he was arrested while trying to board the train in Durango. When it was discovered that no protective legislation existed for antiquities, the complaint against Nordenskiold was dropped and he was allowed to return to Sweden with his collection (Diamond 1993:257-266; Smith 1988:28-30).

This incident provoked Coloradans to finally appreciate the significance of Mesa Verde's ruins and their essential role in the understanding of a lost culture. Preservation efforts were sparked by political chauvinism directed toward Nordenskiold's expedition and sincere fears that invaluable resources were being destroyed. Concerned citizens promoted campaigns which ultimately led to the protection of prehistoric remains (Smith 1988:22-54).

Colorado Cliff Dwellings Association

Although preservation efforts had begun as early as 1889, it wasn't until 1906 that the ruins of Mesa Verde were given federal protection. It was the work of the Colorado Cliff Dwellings Association and two of its leaders, Virginia McClurg and Lucy Peabody, which ultimately encouraged Congress to establish a National

Park to protect the prehistoric resources contained within Mesa Verde.

Inspired by her visits to Mesa Verde, Virginia McClurg became dedicated to rescuing the cliff dwellings from further destruction by creating a park that would ensure protection of the sites. After years acting as a one-woman crusade, McClurg finally sought the support of the Colorado Federation of Women's Clubs and convinced them to take on Mesa Verde as one of its causes. By the turn of the century, the Colorado Cliff Dwellings Association was organized: "the object of this Association shall be the restoration and preservation of the Cliff and Pueblo ruins in the State of Colorado; the dissemination of knowledge concerning these pre-historic [sic] people, the collection of relics; and the acquiring of such property as is necessary to attain such objects" (Colorado Cliff Dwellings Association, Article 11, Easter Eve, 1905, Colorado Cliff Dwellings Association Papers, Archival Files Temporary Storage ARG 1, Box 2, Folder 34, Division of Research and Resource Management, Mesa Verde National Park). Because of her tenacity and dedication, Virginia McClurg was selected as the Association's regent. This association lobbied for a national preservation act to help protect Mesa Verde and other prehistoric sites in Colorado. Unfortunately, this legislation was not immediately passed and lay dormant in Congress for many years (Smith & Smith 1981:4-6; Smith 1988:40-54).

While fighting the preservation battle, McClurg was joined by Lucy Peabody, an energetic abettor with connections in Washington D.C. Because of her political ties, Peabody was the logical choice to lead the legislative fight for the establishment of Mesa Verde National Park. Lucy Peabody became first-vice-regent and Virginia McClurg's right-hand woman in the Colorado Cliff Dwellings Association. Together, these women forged ahead and introduced park bills in both the House and Senate. McClurg also solicited help directly from President McKinley and his wife. After she received a letter rebuffing her notions, McClurg turned to Vice President Theodore Roosevelt who responded with support and encouragement. Further efforts to promote the Association's cause included tours of Mesa Verde for members of the press and other influential parties who could advocate protection for Mesa Verde and its merit for National Park status (Smith 1988:40-47).

Along with the endeavors of the Cliff Dwellings Association, negotiations with the Utes had to be initiated in order to establish a National Park. The Utes still owned the land known as Mesa Verde and the area that included the ruins. In 1903, Congress authorized a leasing agreement to be worked out with the Utes. The parks bill passed in the Senate in 1904, but the House failed to act in time for passage. Fortunately, the publicity generated from the bill's failure did win the public's attention and helped to ignite further support for the creation of Mesa Verde National Park (Smith 1988:47-54).

In 1905, with settlers laying claim to 160-acre homestead sites within the canyons of Mesa Verde, the Cliff Dwellings Association pressed on with a new urgency to protect the prehistoric remains. Another park bill was introduced that year, only to be defeated yet again. With the supportive Theodore Roosevelt now occupying the White House, conservationists seized the opportunity to win some of their battles. Senator Thomas Patterson, a supporter of the Mesa Verde National Park Bill, considered Colorado's most superior resource to be "...not her store of mines, nor her agricultural wealth, but her matchless Mesa Verde Park" (Colorado Cliff Dwellings Association, Article 11, Easter Eve, 1905, Colorado Cliff Dwellings Association Papers, Archival Files Temporary Storage ARG 1, Box 2, Folder 34, Division of Research and Resource Management, Mesa Verde National Park).

In addition to the Mesa Verde National Park bill, a second piece of legislation was introduced which also encompassed the theme of prehistoric preservation. Designed to help protect prehistoric and historic resources found on government domain, the Antiquities Act was being considered in Congress with substantial support. Both of these measures had been previously defeated, but coupled together and with common goals, the Antiquities Act and the Mesa Verde National Park Bill now had the advantage of consolidated conservationist support. Finally, it appeared that both bills would have a very good chance of passing during the Congressional Sessions of 1906 (Smith 1988:55-59).

While these bills were progressing through the House and Senate, it was discovered that none of the major cliff dwellings, such as Cliff Palace and Balcony House, were included in the original 42,000 acres that made up the proposed Mesa Verde National Park. An amendment was quickly introduced which expanded the Park's jurisdiction to include all ruins found within five miles of the intended boundary, adding an additional 175,000 acres of land (Torres-Reyes 1970:9; Smith 1988:58).

Establishment of Mesa Verde National Park

With the boundary problem solved, another issue appeared which posed a potential threat to the nearly realized Mesa Verde National Park. The Cliff Dwellings Association had always debated over the agency, state versus federal, which should be in control of the park. Virginia McClurg, initially favoring federal control, came to prefer a state-run park that could be managed by the Association. McClurg's reversal of opinion caused a significant rift within the Cliff Dwellings Association, specifically with her onetime ally Lucy Peabody. Having always advocated for the national park, Peabody adamantly opposed McClurg's last-minute push for state and Association control of Mesa Verde's resources. Both women had supporters within the Cliff Dwellings Association and Peabody eventually resigned from the organization, taking with her many supporters from the Association (Smith 1988:60-62; Folders 89 & 90, Archival Files, Temporary Storage ARG 1 Box 5, Division of Research and Resource Management, Mesa Verde National Park).

Fortunately, this rift on the eve of the bill's passage did not jeopardize the legislation. The House and Senate pushed both the Mesa Verde National Park bill and the Antiquities Act through Congress in 1906. The fifty-ninth Congress passed the Antiquities Act and it was signed into law by the president on June 8, 1906. The Mesa Verde National Park bill was also approved and signed by President Theodore Roosevelt on June 29, 1906 (Smith 1988:60-62; Folders 89 & 90, Archival Files, Temporary Storage ARG 1 Box 5, Division of Research and Resource Management, Mesa Verde National Park).

Now that Mesa Verde was officially under Federal government control, personnel were necessary to operate the nation's first cultural park. Unfortunately, the Park was neglected during it's first few years with a temporary skeleton crew maintaining the daily operations of Mesa Verde National Park. Within the first year of administration at Mesa Verde, three superintendents were appointed. The first was an acting superintendent, William Leonard, who assumed duties in October of 1906. Leonard was followed in May of 1907 by a second acting superintendent, Charles Werner. Finally on August 3, 1907, Mesa Verde's first permanent superintendent, Hans Randolph, was appointed (Smith 1988:67-69; Folders 89 & 90, Archival Files, Temporary Storage ARG 1 Box 5, Division of Research and Resource Management, Mesa Verde National Park).

Randolph immediately began the tasks necessary to properly administer Mesa Verde as a National Park. To the town's delight, the superintendent set up headquarters operations in Mancos at the Bauer Bank Building. Randolph quickly recognized the priorities necessary to prepare Mesa Verde to welcome its first visitors as a national park (Smith 1988:69-70).

Roads for Mesa Verde National Park

Hans Randolph recognized that two of his first and most pressing priorities were construction of an adequate road system into Mesa Verde and development of a stable water source. The superintendent realized that Mesa Verde's natural water supply was limited and potable water would be difficult to provide if any development was to occur. Randolph proposed that the construction of a reservoir would be adequate to serve visitor and staff needs. However, without an adequate road system, construction of a reservoir would be much more laborious and costly. Randolph, aware of the impact that limited access would have on park development, petitioned in the Superintendent's Annual Report of 1908, for a new road to take precedence over all other objectives: "The expense of conducting the excavations, developing the water supply, and of improvements of every kind, is very great because of this lack of a suitable highway. All supplies, tools, and material have to be transported by means of pack animals at present, and this expense could be materially lessened" (Randolph 1908:7).

For the next decade, the administration focused on the procedures and improvements necessary for Mesa Verde to evolve into a fully operational National Park. Ruins were stabilized, water supplies were enhanced, rangers were added for resource protection, concessions were established and developed, and most significantly for the success of all of these projects, roads were constructed and improved (Torres-Reyes 1970:35-41; Smith 1988:83-86).

It took three years to complete a new wagon road from the northern boundary of the Park to the area known as Chapin Mesa. Continual problems with road slides and washouts, particularly along the famed Knife Edge section of the road, inhibited construction because essential improvements and repairs came to take precedence over new road development (Acting Superintendent Wright to the Secretary of the Interior, letter, July 21, 1911, Bound Volume of Correspondence #3, 1911-1913, p. 162, Division of Research and Resource Management, Mesa Verde National Park).

The original wagon-way, which connected the Mancos-Cortez road with a route to Spruce Tree Camp on Chapin Mesa, was completed on July 13, 1913. Almost immediately after this wagon road opened, improvements were initiated to make it accessible to automobile traffic. On May 28, 1914, six automobiles traveled Mesa Verde's new and improved road, completing the one-way trip within three hours. By 1918, automobiles which were capable of making the round-trip from Mancos to sites on Chapin Mesa within one day, nearly eliminated horse-drawn traffic (Torres-Reyes 1970:35-41; Smith 1988:83-86; Woods Horton 1994:17-20).

Water Supply at Mesa Verde National Park

Water supply was the next pressing problem during Mesa Verde's early development. A few natural seeps and springs were adequate supplies for the occasional visitor in the early days, but with publicity generated by National Park status, and accessibility provided by the new road, visitors would soon be demanding more development and amenities at Mesa Verde.

Problems with adequate water supplies had plagued Mesa Verde since its establishment as a National Park. In a letter to the Secretary of the Interior dated August 17, 1907, Acting Superintendent Charles F. Werner mentioned that "A cement dam could be thrown across the head of [Spruce] Canon [sic] on the rim rock thus making a reservoir..." (Superintendent Shoemaker to the Secretary of the Interior, letter, Aug. 17, 1907, Bound Volume of Correspondence #2, Oct. 13, 1906-Apr. 9, 1914, p.21, Division of Research and Resource Management, Mesa Verde National Park). Werner recognized that plans to supplement the natural water supply would be necessary to accommodate future visitation to the nation's newest national park.

In his first annual report written in 1908, Superintendent Hans M. Randolph also mentioned that "the natural water supply of the park was found to be quite limited, and entirely insufficient for future use" (Randolph 1908:8). Randolph sought the guidance of an engineer who confirmed Werner's recommendation; the Park should take advantage of the natural runoff at the head of Spruce Canyon. A dam, spillway, and two cisterns were constructed to divert the rainwater that naturally flooded the canyon into a system that would allow that water to be utilized domestically (Figure 4.4). This enhanced water catchment system

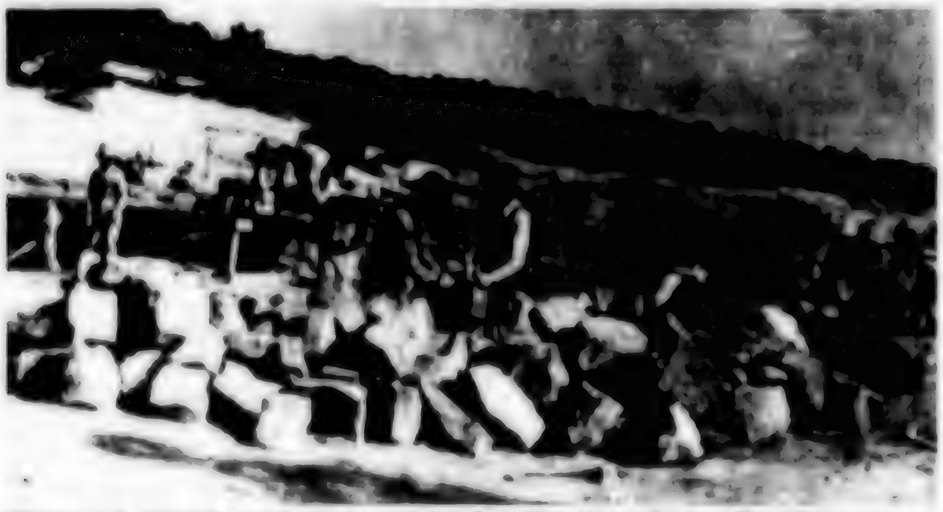


Figure 4.4. Navajo work crew constructing dam above Spruce Tree Canyon (Mesa Verde National Park Archives, Category #101, Photo #20168, 1908-1911, Mesa Verde National Park, Colorado).

alleviated the Park's early water supply problems and Mesa Verde was able to operate efficiently during its first few years of administration (Torres-Reyes 1970:71-75).

Although the water system appeared adequate, a greater supply would be necessary if Mesa Verde National Park planned to develop and expand its operations. The construction of, and improvements to, the Park's road required much more extensive water supplies than were available in 1908. The northern area of Mesa Verde needed its own supply to support road construction activities and to accommodate the crews working and camping in that area. Supplemental water was gathered from a well dug at the head of Navajo Canyon and by windmills erected in Prater and Ruin Canyons. While alleviating immediate water problems, these solutions were only satisfactory for a few years (Torres-Reyes 1970:73-76).

By 1911, the springs at Spruce Tree House and Balcony House were proving insufficient to sustain the amount of expansion occurring at Mesa Verde. Acting Superintendent Wright implored the Secretary of the Interior to engage in a geological survey of the Park for supplemental water sources; "The question of the water supply at the government camp near the ruins is now becoming of vital importance in connection with the general development of the Mesa Verde National Park" (Acting Superintendent Wright to the Secretary of the Interior, letter, July 21, 1911, Bound Volume of Correspondence #3, 1911-1913, p.165, Division of Research and Resource Management, Mesa Verde National Park). An increase in travel was anticipated once the new wagon road was completed and Wright realized the urgency to accommodate future visitors to Mesa Verde National Park.

Wright and his successor, Superintendent Samuel E. Shoemaker both proposed that a permanent building for the maintenance of the Park be constructed, along with a headquarters area to be established at a spot above Spruce Tree House. Their choice for this location was influenced by the bountiful spring found at the head of Spruce Canyon. Shoemaker envisioned a park headquarters area enriched by "...beautiful lawns, gardens, with a fountain of pure water spraying night and day, with flowers and fruit." (Superintendent Shoemaker to the Secretary of the Interior, letter, Sept. 13, 1912, Bound Volume of Correspondence #2, Oct. 13, 1906-Apr. 9, 1914, p.43, Division of Research and Resource Management, Mesa Verde National Park). Although Shoemaker overestimated the supply of the spring, his ideas for enhancing the flow of water for domestic use were insightful.

Shoemaker suggested that a reservoir fed by a gravity system would suffice to deliver water from the spring located at the head of Spruce Tree Canyon to this proposed lush headquarters site. He specified that this reservoir should be constructed of concrete, and built eight feet high and 110 feet wide in order to contain 4,800 gallons of water. Water from this storage system could be fed through a one inch galvanized pipe 1 ½ miles long, with the surplus water being stored at the building site for fire suppression and other purposes (Superintendent Shoemaker to the Secretary of the Interior, letter, Sept. 13, 1912, Bound Volume of Correspondence #2, Oct. 13, 1906-Apr. 9, 1914, p.43, Division of Research and Resource Management, Mesa Verde National Park). Although Shoemaker's vision of the park headquarters area surrounded by gardens and fountains was never realized, his ideas concerning the water delivery system from Spruce Tree Spring were enhanced and eventually adopted.

The United States Geological Survey was solicited to examine all available water sources within Mesa Verde and determine a solution to supply this rapidly expanding national park with sufficient domestic water. Geologist W. C. Mendenhall surveyed Mesa Verde in 1911 and determined that with the addition of 1,500-2,000 gallon concrete cisterns constructed below the spring at Spruce Canyon, all of the Park's water requirements could be met for many years. This solution, along with additional wells dug throughout the Park, provided for all of Mesa Verde's water demands until 1921. It was in this year that a drought, coupled with rapidly increasing visitation, proved that once again, additional quantities of water would be required to meet the Park's future needs and that a more permanent solution would have to be established (Torres-Reyes 1970:75-86).

Grazing in Mesa Verde National Park

Mesa Verde may not have had an abundant water supply in its early days, but the area did have some natural resources that were considered valuable by local residents. Before the National Park was created, grazing and mining operations had taken place when the area was controlled by the Southern Ute Indian Reservation. At this time, there were no regulations for this type of land use and the once plentiful grasslands were nearly overgrazed by the time the Park was established in 1906 (Torres-Reyes 1970:211).

From 1880 until 1906, the Mesa Verde area was considered open range land and cattlemen would utilize the canyons for summer grazing. Years of uncontrolled grazing activities resulted in rapidly depleted vegetation resources. During the first few years of Mesa Verde's administration, grazing was prohibited within Park boundaries. Before long, however, local ranchers along with early superintendents sympathetic to the needs of cattlemen, pushed for grazing to be reestablished at Mesa Verde. Under an act to develop resources on park lands, grazing permits for local ranchers within Mesa Verde National Park were granted by Congress in an act passed on June 25, 1910. In August of 1911, grazing control was initiated and the first permits were granted (Wright 1911:6; Torres-Reyes 1970:211). The recipients of these grazing leases were Prater, Armstrong, and Frink, three cattlemen who owned land within the boundaries of Mesa Verde. Superintendent Shoemaker believed these men to be the logical choices for the recipients of leases because;

> "Messers Prater, Frink, and Armstrong have owned land within the Mesa Verde National Park boundaries for the past 10 or 12 years. They have raised small herds of cattle on the said park. These cattle are so accustomed to the park as a home, that, should they, the said Prater, Frink and Armstrong, loose their privilege of the grazing and forced to move off with their stock, the stock would be a constant menace to the successful bidder (Superintendent Shoemaker to the Secretary of the Interior, letter, Jan. 1, 1913, Bound Volume of Correspondence #2, Oct. 13, 1906-Apr. 9, 1914, p.119, Division of Research and Resource Management, Mesa Verde National Park).

Under this act, cattle were allowed to graze within the boundaries of Mesa Verde National Park from 1911 until 1927 and sheep were grazed until 1918. Although each rancher was granted a permit for a certain number of livestock, the actual sum of grazing animals usually exceeded the number stipulated on the leases. The peak of grazing came in 1918, with 2,008 head of cattle being permitted according to the leases, when in fact, nearly 5,000 head were counted grazing on Park lands ("History of Grazing in Mesa Verde" file, Division of Research and Resource Management, Archival Files, Mesa Verde National Park). Jesse Nusbaum reported that "...grazing far more than permitted, up to a maximum of 4,800 instead of the 850 during World War I, so I was informed by other cattlemen" (Nusbaum 1980:77).

When Jesse Nusbaum became Superintendent of Mesa Verde in 1921, he vowed to end grazing within Park boundaries. Nusbaum cited the destruction of vegetation caused by over-grazing, along with the deterioration of watering holes used by stock as his reasons for wanting to terminate grazing in Mesa Verde; "Cattlemen took maximum advantage of the free range thus opened to grazing and by 1906 the damage to natural vegetative cover by over-grazing was making a shambles of the newly created national park....Conditions were not compatible with National Park Service principles and policies..." (Public Grazing Hearings of the Senate Subcommittee on Public Lands and Surveys, November 19-20, 1942:11, Archival Files, Drawer XX, Division of Research and Resource Management, Mesa Verde National Park).

Nusbaum's plan to eradicate grazing began with a twenty percent reduction in the number of head permitted per year. He first eliminated livestock on Chapin Mesa by drying up the water pooling in Mummy Lake, a prehistoric reservoir that became a favorite watering hole for cattle. By 1928, over-grazing had reduced much of the Park's available grasses and severely limited the number of livestock sustainable on the Park's resources. Although Nusbaum had his part in ridding the Park of grazing, the last cattle company ultimately failed because too many livestock had been utilizing the land for too long (Torres-Reyes 1970:211-218).

Mining in Mesa Verde National Park

This same legislation passed in 1910 which empowered the Secretary of the Interior to "grant leases and permits for the development of the natural resources of the Mesa Verde National Park" (Wright 1911:9), also allowed for the mining of coal found within Park boundaries. Before this time, mining operations had been taking place but without any legitimacy. In a reconnaissance report of 1907, M. K. Shaler of the Geological Survey, discovered that most of the Park area contained coal beds ranging between 2-4 ft in thickness. Shaler reported that quality was satisfactory and coal could be profitably mined from these deposits. Before the Park was established, coal had been mined from Park lands to supply fuel for the residents of Cortez. Once the Mesa Verde area was placed under National Park status, miners continued to extract coal despite park legislation prohibiting such activities (Torres-Reyes 1970:201-203).

In 1908, when Superintendent Randolph discovered that coal was being mined illegally within Mesa Verde, he turned to Washington for direction. Randolph was informed that an investigation into these mining operations was being conducted by the General Land Office and nothing could be done until this inquiry was completed (Randolph 1908:10; Torres-Reyes 1970:201-203).

In the meantime, George S. Todd, a miner from Cortez whose patent had already been rejected, attempted to secure legislation that would allow him to enter Park lands and mine under U.S. coal-land laws. Randolph stated in his annual report of 1908, "It is understood that the department does not favor the passage of such legislation, and in the absence of authority in the Park act for the granting of privileges and leases his application for permission to work the coal lands claimed, later presented to the department, was denied" (Randolph 1908:10; Torres-Reyes 1970:201-203). Todd persisted, applying for a second lease which would contain 80 acres of Park land. In 1911, Todd was granted permission to mine coal for a term of six years along the northwestern boundary of Mesa Verde (Acting Superintendent Wright to the Secretary of the Interior, letter, June 29, 1911, Bound Volume of Correspondence #3, 1911-1913, p.115, Division of Research and Resource Management, Mesa Verde National Park; Torres-Reyes 1970:205-207).

Although all 80 acres of the Todd mine were originally within Mesa Verde National Park, a boundary change in 1913 transferred half of the mine property to the Southern Ute Indian Reservation. Todd mined the 40 acres located within the Ute Reservation, but a costly tramway necessary to transport coal prevented him from developing deposits on Park lands. The mining lease Todd held within the Park expired in 1917 and apparently he never did mine the 40 acres which was considered Park property (Torres-Reyes 1970:206-207).

In 1921, another coal mine was operated within Mesa Verde by partners George McEwen and Stephen Walker. This lease was granted for a period of five years for lands located along the northwest boundary of the Park. When the area proved unproductive, McEwen and Walker applied for and received an area further west and south in Mesa Verde. Because only a marginal amount of coal could be produced from this mine, McEwen and Walker ceased operations by 1923 (Torres-Reyes 1970:206-209).

Although coal appeared at several locations within Mesa Verde, no miner was able to obtain enough profitable quantities to justify operation for more than a few years. By 1931, the Senate passed legislation which required National Parks to operate on a total conservation policy, thus repealing any clauses contained within organic acts allowing for the development of resources on park lands (Torres-Reyes 1970:206-209). With the passing of this legislation, came the end of mining and grazing operations within Mesa Verde National Park.

Historic Context: The Establishment of Early National Park Service (NPS) Administrative Facilities in Mesa Verde National Park, 1921-1931

Mesa Verde experienced considerable development and progress in the 1920s, largely because it was during this decade that the Park welcomed its first truly effective superintendent. All of Mesa Verde's previous leaders had been political appointees with little administrative direction from the newly established National Park Service. Stephen Mather, Director of the Interior, believed that the Park would be more successfully managed by someone who possessed two important qualities: good administrative skills and an extensive knowledge of archeology. He found both of those characteristics in a young archeologist who had worked at Mesa Verde in 1907 surveying and photographing the ruins with Jesse Fewkes and Alfred Kidder (Torres-Reyes 1970:125-129; Smith 1980:105).

In 1921, archeologist Jesse Nusbaum was appointed to replace Thomas Rickner as superintendent. Mesa Verde not only benefited from Nusbaum's archeological expertise, but also from his enthusiasm and determination to manage the Park in an effective manner. These qualities possessed by Nusbaum helped Mesa Verde evolve into an eminent national park. Nusbaum furthered improvements to the Park's road system, developed interpretive signs for the dwellings, enhanced the water system, and moved the administrative headquarters from Mancos into the Park near the most visited dwellings. Until this time, no superintendent nor ranger had endured a winter in the park. Little had ever been accomplished at Mesa Verde during the winter months and no permanent facilities existed to provide for visitor services (Torres-Reyes 1970:125-129; Smith 1980:105).

Architectural Development

Nusbaum set out to construct the buildings necessary to meet the needs of visitors and staff alike. As his first task, the superintendent developed a permanent administrative headquarters at the location which housed Spruce Tree Camp. In 1921, the Park headquarters consisted of a log cabin used as a combination ranger station, museum, and restroom; a three-room ranger station; a building to house a small water tank; an auto shed; an ice house; a shed over the light plant; and seven outhouses. Over the next ten years, Nusbaum helped design and supervise the development of a new headquarters group consisting of a new museum, an administrative building, a checking station, a community building, and a hospital (Torres-Reyes 1970:125-129).

Jesse Nusbaum and his wife Aileen designed and help construct many of the Park's administrative buildings based on an architectural style they created. The superintendent's residence was the first structure built under this project. Following modern Hopi building schemes, the Modified Pueblo Revival Architectural style (Noble 1994:28) was used by Nusbaum as a design characteristic for all of the buildings in the Park's administrative area (Figure 4.5). This type of architecture, consisting of sandstone blocks and mortar, conveyed an appearance much like the prehistoric structures of Mesa Verde. This architectural style created by Nusbaum maintained the theme and integrity of the surrounding natural and cultural setting. (Torres-Reyes 1970:125-129; Noble 1994:Sec. 8: 1-2). In stating his motivations for advocating this type of building, Nusbaum wrote to Director of the National Park Service;

> ...we have drawn on the architecture of the present Hopi Indians for practically all of the details in construction...it seems the most logi-

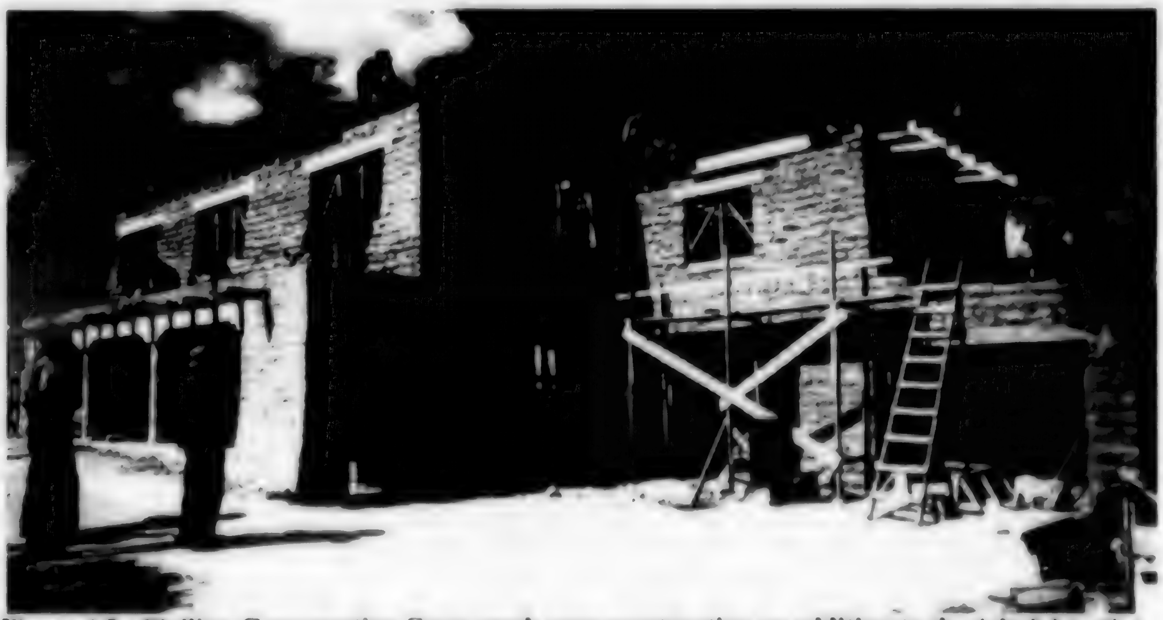


Figure 4.5. Civilian Conservation Corps work crew constructing an addition to the Administrative Building (Bldg # 15) in the Modified Pueblo Revival Architectural Style (Mesa Verde National Park Archives, Category #501, Photo #6266, April 8, 1940, Mesa Verde National Park, Colorado).

> cal for many reasons. The materials necessary for the most part are right on the ground and easily available. This type will not detract one iota from the ancient dwellings which abound in this Park...but will help to preserve the Indian atmosphere which the ruins and environment create...and is what the Pueblo Indian would build here today if he inhabited this Mesa at the present time. The present buildings, ranging from a log cabin to a New England farm house, are not suitable, neither do they carry out the atmosphere which we and you, wish to create (Superintendent Nusbaum to the Secretary of the Interior, letter, August 13, 1921, Green File Folder of Correspondence 1919-1921 #14, Division of Research and Resource Management, Mesa Verde National Park.

Nusbaum was given permission to carry out his plans for construction of the buildings in this manner. The first structure, the superintendent's residence, was completed in 1921. For the next ten years, all administrative structures were designed to reflect this same modern pueblo style.

Another significant task undertaken by Nusbaum was the construction of the Park Service's first permanent Museum. Until this time, artifacts at Mesa Verde had been displayed in a log cabin which was originally constructed in 1916 for use as a ranger station. When Nusbaum assumed the superintendency of Mesa Verde, he recommended that a more suitable building be constructed to better serve increasing visitation and adequately display the valuable artifacts in a fire-proof environment. Also designed in the Modified Pueblo Revival Style, plans for the new archeological museum began in 1922.

Unable to obtain government funds for the museum's construction, Nusbaum turned to private donors to complete his plan. Mrs. Stella M. Leviston of San Francisco was highly interested in the National Park System and she thoroughly enjoyed Mesa Verde in particular. Stella Leviston donated $5,000 over the course of two years toward the Park's museum. When the funds provided by Mrs. Leviston proved insufficient to cover all construction costs, John D. Rockefeller, Jr., later becoming a personal friend of Jesse Nusbaum's, supplied the additional necessary capital.

Construction began in the spring of 1923, with final completion of the museum expected by 1924. A severe water shortage during that summer forced Nusbaum to delay construction in an attempt to ensure enough water for domestic use. The National Park Service's first archeological museum was completed in 1925.

During Nusbaum's superintendency from 1921-1931, the Modern Pueblo Revival Style was used to construct all of the buildings which encompassed the Park headquarters area on Chapin Mesa. The new museum, administrative building, community house (Chief Ranger's Office), restroom (Post Office), ranger club (Research Library), hospital (Spruce Tree Terrace), water tower, and six additional residences were all constructed using the pueblo style of stone, mortar. According to an historical study of the buildings of Mesa Verde compiled by T. Stell Newman and Harold A. La Fleur

> ...these structures form a district cohesive in location, setting, design, integrity, materials, function, construction technique, feeling, and association. It was in these buildings that the sensitivity, dedication, and knowledge of the early Park administrators was applied to the problem of developing Mesa Verde National Park into the entity it is today. As such, these buildings are associated with the early phases of an important American contribution to the rest of the world: the concept of national parks to preserve and protect significant natural, scenic, and historic features for the education and pleasure of a nation's people (Newman and La Fleur 1974:2).

According to these historical architects, Nusbaum's desire for the buildings in Mesa Verde to harmonize with the natural landscape was realized.

> These low-profile buildings are sensitively and knowledgeably designed to blend into the area setting and history without jarring visitors from their communion with the past (Newman & La Fleur 1974:2).

Other architectural developments at Mesa Verde National Park during the 1920s were associated with a permanent utility area designed to support daily maintenance operations. This area, located at Spruce Tree Camp, included facilities such as a bunkhouse and mess hall for maintenance workers, a carpenter shop, corral, machine shop, garage, and warehouse. Located behind what is now Spruce Tree Terrace, this area was utilized as the original Park maintenance yard from 1921-1936. After that time, maintenance facilities, along with some original buildings, were moved to their present location 1 mile north of Park headquarters.

Road Improvements in Mesa Verde National Park

Jesse Nusbaum also directed improvements over the main road system into Mesa Verde and the routes to the dwellings. He suggested new routes for the north entrance into the Park and along the "big hill" to replace sharp and dangerous switchbacks. The existing Park entrance and a road cut section located approximately three miles into the Park, what is now referred to as "Nusbaum Cut", were among his contributions to road improvements that are still in use today.

Superintendent Nusbaum also implemented improvements on the routes leading to the dwellings on Chapin Mesa. Until 1921, visitors wishing to see the ruins by automobile were forced to travel a 15 mi artery from Spruce Tree House across Chapin Mesa to the locations of Balcony House, Cliff Palace, Square Tower House, and Sun Point. Nusbaum suggested the present circle route which encompassed only 2 1/2 miles of new road, while reducing the total distance traveled by four miles.

Figure 4.6. Rockslide removal along the Knife Edge section of the Park road (Mesa Verde N. P. Archives, Photo #6249, 1941, Mesa Verde N. P., CO).

In suggesting improvements to the main road, Nusbaum proposed that the original Knife Edge section be reestablished. Having been cut into an unstable shale layer, this section of road had been abandoned in 1913. In his annual report of 1911, Acting Superintendent Wright stated; "The insecure foundation of the present roadbed between these points permits slides and caving in the rainy season, necessitating continuous repair work to make it passible." (Wright 1911:7) (Figure 4.6). Recognizing the aesthetic value of this portion of road which afforded spectacular views of the Montezuma Valley below, Nusbaum advocated the reopening of this original scenic roadway (Torres-Reyes 1970:141-144).

In order to help complete this road project, Nusbaum hired local Navajo men as day laborers. Used as daywork crews since 1913, Navajo men often were part of the road construction labor force. These crews, having traveled from their reservation land in Arizona, would camp along the main road route in temporary hogans while employed by the Park. As a result, numerous historic Navajo sites consisting of abandoned hogans and sweat lodges are found within Mesa Verde.

Proving themselves to be commendable workers, Nusbaum praised the Navajo crews in his monthly reports to the Director of the Interior; "The Navaho [sic] Indians, 77 in number at one time, did more work in a day than his steam shovel in the best week it operated" (Superintendents monthly report, Nov. 1, 1922 to Jan. 31, 1923, Division of Research and Resource Management, Mesa Verde National Park). Although the Knife Edge road did prove too unstable for continuous use and was abandoned a second time, Nusbaum contributed greatly to road development by encouraging much of the route which is still followed by modern visitors.

Along with the road improvements, the early Nusbaum years saw the development of improved tourist accommodations which moved from the canyon rim west of Spruce Tree House to the mesa spur overlooking Spruce and Navajo Canyons. The hotel was enlarged to include cottages and more tent cabins. Further facility expansions were planned in 1931, but a pressing water supply problem forced the concessionaire to suspend improvements until an adequate amount of water could be sustained (Torres-Reyes 1970:135-137).

Jesse Nusbaum directed much of his superintendency toward improving the water system at Mesa Verde and ensuring that the Park's future would not be plagued with supply problems. His water enhancement plans and projects are discussed in a separate chapter.

Historic Context: Depression-Era Development at Mesa Verde National Park, 1931-1942

Created as a New Deal program by President Franklin D. Roosevelt, the Emergency Conservation Work (ECW) force was established during the Great Depression. This program was aimed at alleviating two of the nation's greatest concerns during this severe economic downfall: unemployment among young Americans, and the decline of natural resource conservation. In order to help temper the plummeting economy while attempting to tackle these concerns, Roosevelt designed a program which would employ young men in the conservation effort, focusing on preservation projects within national parks and forest land. Later to be referred to as the Civilian Conservation Corps (CCC), this labor force was established in a militaristic manner, providing destitute young men with marketable occupational skills designed to help secure future employment (Crook 1984:1; Paige 1985:1-32).

The National Park Service benefited greatly from these conservation-oriented programs. CCC camps were established in 94 national park and monument areas to work on projects such as road and trail maintenance, fire hazard reduction, reforestation, and landscaping. Between 1933 and 1942, three camps of CCC workers were stationed within Mesa Verde. The first, camp NP-2-C, was established in Prater Canyon for seasonal occupation. Proving that work could still be accomplished during heavy snowfall, two more camps, NP-5-C and NP-6-C, were established near Park headquarters to be inhabited year-round (Crook 1984:7-14). Founded on the site presently referred to as the CCC loop, these camps were established next to each other on Chapin Mesa in this location because of their proximity to a reliable water source, power lines, phone lines, and most of the work project areas. Properties of the camps were laid out in a "U" shaped configuration consisting of barracks, a mess hall, an administration building, a recreation hall, latrines, a garage, an oil house, and an educational building. A utility area was also erected in a central site between both camps to serve as a maintenance yard. Some of these structures remain standing today, including the recreation hall from camp NP-5-C, which is still used for Park functions. Many of the buildings from the utility area remain intact and are used for storage. Camps NP-2-C and NP-6-C were eventually abandoned, while camp NP-5-C continued to be occupied until the CCC was disbanded in 1942 (Crook 1984:7-14).

During the ten years the Civilian Conservation Corps worked in Mesa Verde, enrollees accomplished many worthwhile tasks which are still praised today (Figure 4.7). Their projects were varied and included every aspect of Park operations, but all aimed toward training enrollees in a skill that would help them secure future employment. Some of the many tasks accomplished by the participants included building of range fence, corrals, and furniture; construction of the campground near Park headquarters; construction of facilities and housing; installation of water, sewer, and power lines; road and trail maintenance; archeological excavation; and office operations (Crook 1984:43-65).

Probably the most lauded projects accomplished by the CCC were those associated with the Park's museum. The men reconstructed pottery for display in the museum, catalogued artifacts, and helped construct exhibits. The most famous exhibit created by the CCC was the series of four interpretive dioramas which have remained on display in the archeological museum since their completion (Smith 1988:136-138; Crook 1984:43-65).

Another significant project undertaken by the CCC at Mesa Verde was the remodeling and construction of facilities. Mesa Verde was still evolving as a national park when the CCC arrived in 1933. During his first superintendency, 1921-1931, Jesse Nusbaum had contributed greatly to the development of the

Figure 4.7. CCC carpenters, in the building which now houses the Museum Bookstore, crafting furniture for new Park facilities (Mesa Verde N. P. Archives, Category #401-02, Photo #438, 1940, Mesa Verde N. P., CO).

headquarters area, but many more buildings were necessary to accommodate this rapidly expanding Park.

The CCC participants were assigned the task of remodeling many of the structures built during Nusbaum's first superintendency. In the administration building, extra rooms and a basement, excavated out of sandstone, were added. The CCC also remodeled and constructed additions to the seven Park residences located in the headquarters area. Among other alterations, porches and garages were added and improvements were made to the roofs of these structures. The Superintendent's residence was remodeled adding a bedroom, study and a second bathroom. In addition, the CCC converted the stone water tower into a residence, utilizing vigas (peeled beams) and latias (split-wood slats) for ceiling construction typically used in the architecture of the Modern Pueblo Revival Style. Another conversion took place when a new comfort station was built. The old restroom facility, conveniently located next to the administration building, was remodeled to house the post office, which is still in use (Newman and La Fleur 1974; Crook 1984:48-52).

Although some residences had been constructed the previous decade, many more accommodations were necessary to house Mesa Verde's increasing personnel. In the 1930s, a temporary tent colony was erected in order to house seasonal staff, but it was apparent that a more permanent solution was necessary. Plans were made for housekeeping cabins to be constructed near the new utility area for the needs of temporary Park employees. The CCC was given the considerable task of building these homes. The crews were involved with every aspect of construction, including carpentry, masonry, plumbing, and electrical wiring. The design of these buildings was of

> ...frame construction and plastered on inside. They are 17 feet by 31 feet outside measurements and contain a living room, bedroom, breakfast nook, kitchen and bathroom...Under one end of the building is a small basement for storage of fuel, etc. It can be seen that these buildings are going to be very comfortable and will be a monument to E.C.W. in Mesa Verde and as the Park has very inadequate housing facilities for regular personnel and traveling technicians they certainly are needed (Narrative Report, Fourth Enrollment Period, Oct. 1st, 1934-Mar. 31st, 1935, p. 10, North Chapin Mesa Camp N.P.-6-C. Mesa Verde National Park, Colorado).

Camps NP-5-C and NP-6-C each constructed four cabins which were occupied immediately upon completion. Another seven houses were under construction by October, 1935. These well-built cabins are a monument to their builders and are still used to house Park staff (Superintendents Annual Report, 1934:24 E.P. Leavitt; Crook 1984:49-50).

Another project completed by the CCC was the construction of six hogans to house the Park's Navajo workers and their families. Located near the cisterns approximately 1/2 mile north of headquarters, these hogans were built of stone in the traditional octagonal shape. Two of these residences were outfitted with plumbing and bathrooms and a separate comfort station was constructed for residents of the other four hogans. These hogans continue to house seasonal Park staff, including current Navajo crew members (Crook 1984:50).

In an effort to alleviate congestion near Park headquarters, a six-year development plan was designed in 1932. This program halted development around Spruce Tree Camp because of the overdevelopment in the headquarters area. Part of this plan involved moving the maintenance yard from Spruce Tree Plaza to a new utility area approximately one mile north of headquarters. In 1934, the CCC was involved with relocating five original buildings to the new utility area. More construction on facilities began at this time, and the new maintenance yard was completed in 1937 (Noble 1984:19-20; Torres-Reyes 1970:223-224).

Another scheme to help eradicate overcrowding at Park headquarters was the relocation of the campground. In Mesa Verde Park's early days, visitors camped immediately adjacent to administration facilities near Spruce Point. A new location was chosen on the rim overlooking Spruce Canyon, approximately 1/2 mile northwest of Park headquarters. The CCC crews were assigned the duty of constructing this new campground which consisted of 83 sites. The enrollees helped to build spaces for tents and parking, fire rings, and picnic tables for all of the sites. Support facilities consisting of two comfort stations and five sandstone bunkers for trash and procurement of firewood and water were also constructed. In addition, the CCC landscaped the grounds in a manner which restored the natural setting of the mesa top. This facility was the Park's primary campground from 1935 until 1954, when it was replaced by the current, larger accommodations in Morefield Canyon. The CCC campground area was then converted to a day picnic area and it is still used for that purpose (Crook 1984:54-55).

As Mesa Verde expanded, so did visitation and automobile traffic. In 1934, it was determined that an additional parking area would be necessary to accommodate the increasing number of vehicles entering the Park. The CCC went to work constructing parking areas and installing curbing. They quarried sandstone blocks and constructed all of the curbing on the road circling the Park's headquarters. The site chosen for the new parking area was located across the road from the museum. Landscape architects designed the parking lot in a circular route with retaining walls and an aesthetic planting island in the center (Figure 4.8). Foot paths encircling the lot were also constructed to direct pedestrians to the museum and administrative buildings. The CCC crews again quarried all of the sandstone from a site on Chapin Mesa, completing the parking area known as the Round Lot (Crook 1984:58).

In the 1930s, much of the work associated with road maintenance and construction was accomplished by

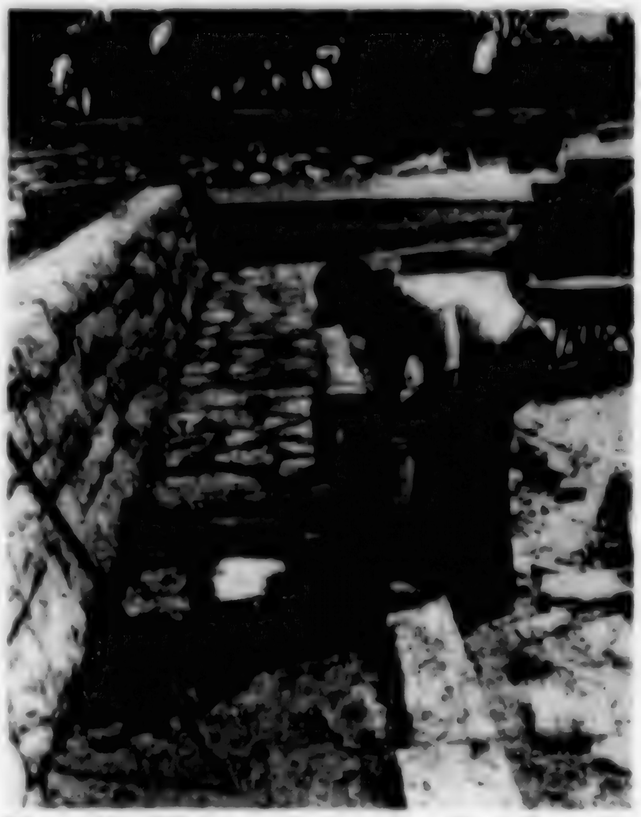


Figure 4.8. CCC mason laying stones for walkway in the "Round Lot"parking area of the Administrative District (Mesa Verde N. P. Archives, Category #601, Photo #2986, 1941, Mesa Verde N. P., CO).

the CCC. Enrollees cleaned and plowed the roads during the winter, maintained ditches, banked the slopes on road cuts for erosion control, and constructed culverts to divert water drainage (Crook 1984:56-58).

When the deep water well provided a reliable and consistent water source, the dams at the head of Spruce Tree Canyon became obsolete. In 1940, the CCC was assigned to dismantle three of the four masonry dams and restore the area to its natural setting (Crook 1984:64-65).

The beginning of World War II brought the end of the Civilian Conservation Corps. The CCC was disbanded on July 1, 1942 and the three camps at Mesa Verde were deserted. The Army removed or dismantled most of the buildings at Mesa Verde and used them elsewhere. The structures which comprised camp NP-5-C, however, were considered of no military value and were relinquished to the National Park Service. Many of these historic buildings continue in use today at Mesa Verde and retain significance within the historic context of Depression-Era Development in Mesa Verde National Park, 1931-1942.

The CCC contributed extensively to the National Park System and to Mesa Verde in particular. These work crews accomplished many projects during their one decade at Mesa Verde which would not have otherwise been completed.

Description of Historic Districts and Sites Impacted by the Waterline Replacement Project within Mesa Verde National Park

Phase III of the Waterline Replacement Project impacted six areas designated as historic districts (5MT9790; 5MV3938 and 5MV3939; 5MV3941; 5MV3990; 5MV3991; 5MV3992) and nine historic sites (5MV3942, 5MV3962, 5MV3963, 5MV3964, 5MV3965, 5MV3966, 5MV3973, 5MV3977, 5MV3993) within Mesa Verde National Park. There were no adverse effects to any structures or features within the historic districts. The historic sites were excavated, tested, and monitored as part of mitigation work.

Mesa Verde Archeological District was listed as Site 5MT4341 on the National Register on October 15, 1966 with 31 contributing buildings and no non-contributing resources. The boundaries of this listing encompassed the entire Park. In this sense, all cultural resources, prehistoric and historic, within Mesa Verde National Park are administratively listed on the National Register of Historic Places. However, this type of administrative listing "did not produce any specific information about the significance or boundaries of these eligible properties" (Noble 1993:34). The Colorado Historical Society has records of some properties within Mesa Verde listed on the National Register, but the information is confusing and contradictory (D. Heckendorn to G. Ives, letter 9 May 1994, Mesa Verde National Park Division of Research and Resource Management). Mesa Verde Administrative District is listed in the Colorado Historical Society records as site 5MT9790, designated as a National Historic Landmark on May 29, 1987. The information on this designation is incomplete at the Colorado Office of Archaeology and Historic Preservation, with no record containing a resource count as to contributing or noncontributing status. Although attempts have been made to document the historic structures within Mesa Verde, recordation has yet to be completed or accepted by the National Register office in Washington D.C. Nominators have had their own designations for districts and properties and none of these designations coincide. The latest documentation was submitted in draft form in December, 1993 to Mesa Verde National Park by historian Bruce J. Noble, Jr. The status of this nomination is still pending. This report follows Noble's historic district designations.

In his multiple property submission *Historic Resources of Mesa Verde National Park*, Bruce Noble included 12 separate districts within the Park based on architectural style and function of the buildings. These districts were nominated within two historic contexts: I. The Establishment of Early National Park Service Administrative Facilities in Mesa Verde National Park, 1921-1931 and; II. Depression-Era Development in Mesa Verde National Park, 1931-1942 (Noble 1993). At the time of the Mesa Verde Waterline Project Phase III, these districts had not been listed separately on the National Register. All archeological sites encountered during the project were treated in accordance with Section 106 of the National Historic Preservation Act, in full recognition of the National Register potential of these properties.

For the purposes of this report, only the six districts affected by Phase III of the Mesa Verde Waterline Re-

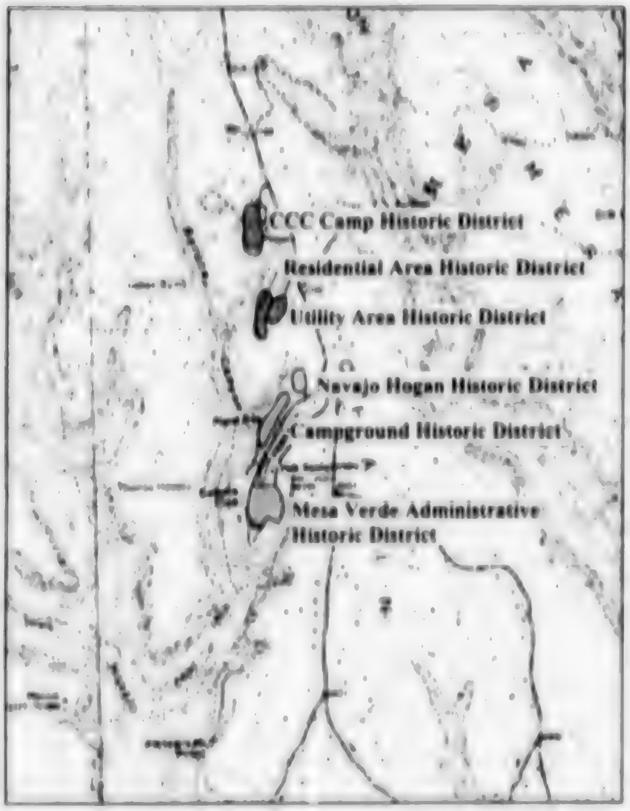

CCC Camp Historic District
Residential Area Historic District
Utility Area Historic District
Navajo Hogan Historic District
Campground Historic District
Mesa Verde Administrative Historic District

Figure 4.9. Six Historic Districts nominated for the National Register (Noble 1993).

placement Project will be discussed. These districts include the Mesa Verde Administrative District (5MT9790), Civilian Conservation Corps Camps (5MV3938 & 5MV3939), Civilian Conservation Corps Campground (5MV3941), Utility Area Historic District (5MV3990), Residential Area Historic District (5MV3991), and Navajo Hogan Historic District (5MV3992) (Figure 4.9).

Mesa Verde Administrative District (5MT9790)

The first of Noble's district nominations is the Mesa Verde Administrative District, under the context of the establishment of Early National Park Service Administrative Facilities in Mesa Verde National Park, 1931-1942. This area was designated a National Historic Landmark (NHL) on May 29, 1987. As originally listed, the Administrative District included six contributing buildings; the Superintendent's Residence (#1), Research Library (#9, formerly the Ranger Dorm), Museum (#13), Chief Ranger's Office (#14, formerly the Community Building and Natural History Museum), Administration Building (#15) and the Post Office (#45, formerly a Comfort Station). The purpose of Noble's renomination is a boundary increase for this district to include seven residential structures, buildings #2-8, which he considers "...are historically, architecturally, and geographically associated with the original NHL historic district. " (Noble 1993, sec 7:1). This boundary increase will also include the round parking lot constructed by the CCC and a tennis court associated with the residences. Noble states that

> ...The construction of these houses, parking lot, and tennis court culminated Nusbaum's plan to develop a permanent administrative presence within the boundaries of the national park. Because this step represents an important stage in the development of the park, the properties in the boundary increase area convey Nusbaum's personal contribution to Community Planning and Development activities (Noble 1993, sec 8:2).

Noble also incorporates one non-contributing structure, a recently constructed restroom facility that is architecturally compatible with the other buildings in the district (Noble 1993, sec 7:1).

Civilian Conservation Camps (5MV3938 & 5MV3939)

Created as an emergency work relief program during the Depression Era, the CCC came to work for the Park Service and established three camps in Mesa Verde between 1933 and 1942. The adjoining camps of NP-5-C and NP-6-C on Chapin Mesa originally operated as separate entities, but eventually merged into one when camp NP-6-C was abandoned.

Based on the Historic Context of Depression-Era Development in Mesa Verde National Park, 1931-1942, this nomination of the Civilian Conservation Camps Historic District focuses on the existing features and buildings at camp NP-5-C and the common utility area used by the Chapin camps. Because no features nor structures remain from the two abandoned camps, they are not included in this district (Noble 1993, sec. 7:1). Noble designates six buildings and one site as contributing resources and four recent structures as non-contributing.

Noble has separated the CCC Camp Historic District into two sections. The northern section (5MV3938) consists of the utility area constructed and used by the CCC, which includes four structures (#'s 66-68, & 127). These buildings are currently used as maintenance storage facilities. Camp NP-5-C (5MV3939) makes up the southern section and includes extant buildings and features. The remaining structures include the CCC Recreation Hall (#148), a barracks building (#156) now used for storage, and a maze of trails that once circumvented the entire camp (Noble 1993, sec. 7:1-2).

According to Noble, this area exhibits historical integrity because there are more contributing resources than non-contributing and the original layouts for both areas are still evident. Furthermore, Noble sites the original trails, stone curbing, and landscape plan as significant features that have helped maintain the historic character of this district.

Civilian Conservation Corps (CCC) Campground (5MV3941)

The CCC Campground area is nominated under the historic context Depression-Era Development in Mesa Verde National Park, 1931-1942, because of the campground's significance in the areas of architecture, landscape architecture, and politics/government.

Because camping procedures were unregulated during the 1920s, not much is known about Mesa Verde's early campgrounds. At this time, campers were usually allowed to pitch their tents in cleared areas and open meadows, resulting in extensive damage to vegetation. In an attempt to help curb such destruction of natural resources, agriculture plant pathologist E. P. Meinecke advocated greater regulation for camping areas. He created a campground design based on the same arrangement given to cabins sites: "Essential components of his overall campground plan included one-way circulation roads with camp sites set off at forty-five degree angles from the roads; a defined space for parking a car within a camp site; and a permanent fireplace, table, and tent site" (Noble 1993, sec 8:2). Employed by the National Park Service during the 1930s, Meinecke came to Mesa Verde in 1935 as a consultant to assist with the building of the new campground (Noble 1993, sec 8:2).

Although converted to a day-use picnic area in 1954, Noble argues that "...the essential features of this 1935 campground plan remain very much in evidence today," (Noble 1993, sec 7:1). The campground contains 54 contributing and two non-contributing historic resources. Two of these contributing structures are comfort stations (#46 and #65) built in the Modified Pueblo Revival Style by the CCC in 1935. In addition, four structures designed as fuel, water, and trash stations were built of sandstone walls in a rectangular configuration. Other landscape-architectural features constructed by the CCC consist of thirteen fireplaces, fourteen culverts, eighteen retaining walls, two sets of stairs and retaining walls connecting areas of differing elevation, and two log and sandstone drinking fountains (Noble 1993, sec 7:1-3).

Utility Area Historic District (5MV3990)

This maintenance area was constructed in the 1930s to replace the original utility yard near Park headquarters. Because it was constructed by the CCC, this district is associated with Depression Era Historic context. Because this maintenance yard was created as part of a six-year plan to end congestion near Park headquarters, it is historically significant in the topical areas of Community Planning and Development activities in the Park (Noble 1993, sec. 8:1).

The Utility Area Historic District contains 11 contributing buildings (#'s 48-49, 50-57, & 70) and 3 non-contributing structures. The construction style for all but one of the buildings is a rustic utilitarian indicative of the era in which they were built. The only exception to this utilitarian style is building #51, the Fire Cache. This structure is constructed in the Modified Pueblo Revival Style. Although five buildings (#'s 49 & 53-56) were moved from the original 1920s maintenance yard near Park headquarters, Noble argues that "Because these relocations took place over fifty years ago, each of these buildings still retain the integrity necessary for listing on the National Register." (Noble 1993, sec. 7:2).

The three non-contributing buildings were classified as such because they are younger than fifty years. Noble states, however, that these structures are "...visually compatible with the remainder of the historic district, and because the vast majority of buildings fall into the contributing category, these non-contributing proper-

Figure 4.10. Residential cottage based on the National Park Service Rustic Style (Mesa Verde N. P. Research Center, Classified Structure File for Site 5MV3991, Mesa Verde N. P. CO).

ties do not detract from the overall integrity of the historic district." (Noble 1993, sec. 7:6).

Residential Area Historic District (5MV3991)

Consisting of 21 contributing structures, and no non-contributing resources, this residential area (5MV3991) was constructed during the Depression Era by the CCC. As with the utility area, this district was part of the six-year Park development activities plan and has significance in the area of Community Planning/Development (Noble 1993, sec. 8:1).

The Residential Area Historic District contains eighteen buildings (#'s 17-29 & 31-35) constructed by the CCC in a standard design based on the National Park Service Rustic Style (Noble 1994:13). The cottages were designed with board and batten exterior walls on a sandstone foundation (Figure 4.10). As built by the CCC, each cabin consists of a living room, kitchen, bedroom, bathroom, porch, and a basement. Some structures had later additions and alterations, but Noble argues that in most cases, these changes could be easily reversed and do not impact the historical integrity of the district (Noble 1993, sec. 7:2).

Two of the buildings within this district (#'s 16 & 58) were moved to the new maintenance area in 1934 from their original location at Spruce Tree Camp. Although both have had interior modifications, Noble still includes these structures because they were relocated over fifty years ago and retain enough historic integrity to justify inclusion into this district (Noble 1993, sec. 7:1-3).

Navajo Hogan Historic District (5MV3992)

Mesa Verde has employed Navajo workers since the inception of the Park (Figure 4.11). For this reason, Park planners suggested in 1935 that a "Navajo Indian Village", based on traditional Navajo habitations,

Figure 4.11. Navajo workers at hogans located in the CCC Campground area before the construction of the Navajo Hogan District structures (Mesa Verde N. P. Research Center, Classified Structure File for Site 5MV3991, 1929, Mesa Verde N. P., CO).

be constructed for these employees. The original proposal called for twelve hogans (two for family housing, ten for single men) and a comfort station to serve all residents. As with all other construction projects taking place at the time, this task was turned over to the CCC. They completed the two family hogans first (#'s 36 & 37) by 1936 and the following year built two single residences and the comfort station (#'s 38, 39 & 47). The CCC were only able to complete two more single dwellings (#'s 43 & 44) before the Emergency Conservation Work program was canceled in 1942 (Noble 1993, sec. 7:1-2).

Noble has nominated this area under the criterion of Politics/Government because of the CCC work involved. This district also meets the standards of Architecture because of the traditional Navajo design style of circular or polygonal building shapes (Noble 1993, sec. 8:2).

Effects of the Waterline Replacement Project upon Historic Structures and Features in Mesa Verde National Park

The waterline project entered many of the historic structures in Mesa Verde, thus affecting nine historic districts described by Noble. For the most part, the replacement waterline went into buildings at the same location as the old line. For the buildings which needed some modification to accommodate the new pipe, impact was minimal and resulted in no damage to historic integrity. As a result, Mesa Verde's historic structures were not adversely affected by Phase III of the Waterline Replacement Project.

Mesa Verde Administrative District (5MT9790): Effects on Structures

Of the fourteen buildings in the Mesa Verde Administrative District, only the Museum (#13) was affected by the replacement of the waterline. With the exception of the Museum, the new line was tied into the existing pipe in the Administrative District buildings and no new construction was necessary for these structures.

The waterline to the Museum required a larger pipe and some intrusive penetration into the basement wall. A trench was dug five feet below present ground surface to expose the Museum's foundation along the northwest wall. A hole was then cut into the sandstone foundation using hand tools. Mechanical devices were necessary to drill through the interior concrete wall leading to the basement. Although penetration of the inner wall did take place, impact was minimal and did not adversely affect the historical integrity of the Museum.

Mesa Verde Administrative District (5MT9790): Effects on Features

The construction for the new waterline required some disturbance of the curbing and retaining walls installed by the CCC in the Administrative District. The new pipeline was installed below the retaining wall between the Superintendents Residence (#1) and the Administration Building (#15). In an attempt to limit impact, the wall stones were removed during construction and replaced in the same positions when pipe installation was completed.

The contractors drilled in order to install the new waterline into the museum, to the drinking fountain near the Museum entrance, and to the fire hydrant near the round parking lot. Drilling was done under the existing CCC sidewalk curb to install the pipe beneath the stones. This subsurface drilling avoided the historic feature and did not disturb the curbing.

CCC Camp Historic District (5MV3938 and 5MV3939): Effect on Structures

Buildings #66-38, #127 and #156 do not have waterlines and were not affected by the Mesa Verde Waterline Replacement Project, Phase III. At Structure #148, the Recreation Hall, the new line tied into the existing line, requiring no new construction, Thus, the historic integrity of this structure was not adversely affected.

In the CCC camp historic district, the new waterline ties into the existing line near the Natural Resources Office and is fed through spur lines to the CCC area buildings. No landscape-architectural features were disturbed and no structures were altered as a result of construction activities.

CCC Campground (5MV3941): Effect on Structures

The two comfort stations in the CCC Campground (#'s 46 & 65), were not impacted by construction of the new waterline. The replacement pipe was tied into the old line near the campground entrance, with water flowing through spur lines to the structures. The original route into the comfort stations was used for the new line, requiring no new construction. The historical integrity of these buildings remains intact.

CCC Campground (5MV3941): Effect on Features

During construction activities damage occurred to an historic feature located in an abandoned part of the CCC campground. A masonry culvert was disfigured by a bulldozer during snow-removal from the construction right-of-way. Mesa Verde's stabilization crew repaired the damage and the replacement waterline was routed under the associated metal culvert pipe. The repair work to the sandstone culvert restored its historical integrity, resulting in no adverse effect upon the feature.

Navajo Hogan Historic District (5MV3992): Effect on Structures

The waterline in this district tied into all of the structures (#'s 36-39 & 43-43) at the existing line. No new construction was necessary and there was no adverse effect on any of the buildings.

Utility Area Historic District (5MV3990): Effect on Structures

Buildings #'s 48-54 and #70 have no water facilities. Therefore, the new waterline did not enter these structures and had no effect on their historic integrity. The new waterline tied into the existing line at buildings #'s 55 & 57 and no new construction was necessary. At Building #56, a narrow trench was excavated to 5 ft below present ground surface along the northwest foundation wall. Because a larger line was necessary for this building, a two-inch hole was cut through the sandstone foundation wall. This impact was minimal and did not adversely effect the integrity of the structure.

Residential Area Historic District (5MV3991): Effects on Structures and Features

It was necessary to remove and replace the CCC curbing near the east wall of Residence #16 to install the new waterline. The pipe was then connected to the existing line and no new construction into the structure was necessary.

At Residence #17, the route of the old line was abandoned and the new waterline was installed in the back of the house. A narrow trench was excavated to 1.5 m (5 ft) below present ground surface along the northwest foundation, and the sandstone wall was cut to allow a 1 in line access into the basement.

The waterline leading into Residences #'s 18-25 simply tied into the existing line and no new construction was necessary. At Residence #23, however, it was necessary to remove and replace the sandstone curb in front of the house to allow a route for the pipe. The curbing feature was not adversely affected by this procedure.

For Residences #'s 26-35, the old pipe line into the back of the houses was abandoned in favor of a new route into the front of the houses. A new route required digging 5 ft below the present ground surface along the northwest foundation wall, and drilling a 1 in hole into the sandstone wall. This same procedure was followed for the dormitory building (#58) but was carried out along the northeast wall. The new construction was minimal and caused no impact to the historic integrity of the structures.

Navajo Hogan Historic District (5MV3992): Effect on Features

The features in this district include the water catchment system designed and installed during the Nusbaum era. This system involved two one-acre square metal catchments, two subsurface concrete storage tanks, two round subsurface steel tanks, valve boxes, and various culverts. The two metal catchments were removed sometime after 1950 (Smith 1992: Historical Archaeology Component Form). Consequently, they were not affected by construction activities associated with this project.

Before construction began, it was thought that the two subsurface steel storage tanks were still intact. However, when trenching went through the area, it was discovered that the tanks had in fact been removed. There is no documentation that indicates when these tanks were dismantled.

The extant features of this water system are the valve boxes, subsurface concrete reservoirs, and the culverts. The valve boxes were completely avoided and left undisturbed by construction of the replacement waterline. The two reservoirs were avoided and scheduled to be removed by the contractor, but this part of the project was ultimately removed from the scope of work.

An attempt was made to avoid the remaining sandstone culverts. However, some damage did occur during construction activities to one of the metal encasements that extended under the road. This damage was minimal, and the impact resulted in no adverse effect upon the historic integrity of the feature.

Summary and Conclusions of Mesa Verde Waterline Replacement Project Historical Overview

This historical overview has focused on relevant historic contexts identified for southwest Colorado which give a framework for understanding the archaeological and historical resources which were impacted by the Mesa Verde Waterline Replacement Project Phase III. Although the waterline entered many historic buildings and was dug through seven historic districts in Mesa Verde National Park, in general, there were no adverse effects to the historic cultural resources.

Land use in the study area changed over time from documented reports of Native American Ute groups to Euro-American mining, ranching, farming, and conservation. The Utes used the land for their hunting and gathering of natural wild resources. Spanish explorers established trails through the study area. Euro-Americans trapped beaver and U.S. Army Corps of Topographic Engineers mapped parts of the area. The Gold Rush in the 1850s affected the Mancos and Dolores River Valleys but these were seasonal uses with the miners moving out before the onset of winter.

The use of the land changed when the Rio Grande Southern Railroad was built through the study area in 1880 connecting Durango with Rico through Mancos. The logging industry grew in the mountainous areas. Montezuma Valley was named by Captain John Moss, a mining scout for the wealthy Parrott Brothers and men of his scouting party later established homesteads in the Mancos Valley. Cortez was established by Montezuma Valley Irrigation Company in 1886 and the land of the valley was used for agriculture, cattle grazing, and permanent homes.

Land use in the study area changed again in the 1920s with federal activity of the United States Government. Mesa Verde National Park was established as were forest reserves and other federal land set aside for preservation of the natural and cultural resources.

CHAPTER 5

CULTURAL RESOURCE BASE: ARCHEOLOGICAL SURVEY

Gay Ives

Introduction

During the course of the construction of Mesa Verde Waterline Replacement Project Phase III a total of 47 sites were discovered and recorded over a noncontiguous 43 ha survey area and along the 63 km pipeline within the Mesa Verde Waterline Replacement Project area. The cultural resources ranged in time from the Late Archaic period through the Anasazi period through the Euro-American Historic period. The archeological sites varied from isolated artifacts and features to large habitation sites.

One of the primary goals of the survey research was to understand the various forms of human land utilization through time which would be reflected in the cultural resources along the 63 km (39 mi) transect length of the survey area across diverse geographic zones in the Colorado Plateau region of southwest Colorado. With information from the 846 sites recorded during previous archeological survey work within 1.6 km of the study area, it would also be possible to begin to understand settlement patterns. More detailed studies and analyses of sites which were tested and excavated appear in other chapters of this report.

The cultural resource base in the project area included multicomponent habitation sites, seasonal base camps, limited activity areas, isolated features (kilns, hearths, structures), homesteads, a railroad grade, historic structures, and isolated artifacts. Detailed descriptions of those resources newly discovered or reevaluated as part of the work for the Mesa Verde Waterline Replacement Project Phase III will be reported in this chapter along with a summary of previous work.

For this report, the project area has been divided conceptually into three segments: The Mancos Segment, the Montezuma Valley Segment, and the Mesa Verde Segment (Please refer to Figure 2.1 for location of project area). Although the three segments of the Mesa Verde Waterline Replacement Project, Phase III are closely connected in their cultural resource base, there are notable differences in the time of occupation and the forms of land use.

In the Mancos Segment, located in the La Plata Mountain foothills, the cultural resource data base indicates that Archaic and Anasazi people utilized this area to procure and process floral and faunal resources on a seasonal basis. In historic times, homesteaders attempted to make a living farming and ranching; and the area was used for historic railroad transportation.

In the Montezuma Valley Segment, located at the base of the North Escarpment of Mesa Verde National Park, human populations were well established from the Basketmaker III and Pueblo I periods. Site density and population increased in the Pueblo II period and continued to increase throughout the early Pueblo III period with abandonment of the Montezuma Valley by A.D. 1200-1300. Historic occupation in the Montezuma Valley Segment included homesteads in the early 20th century with numerous wagon roads and pack trails. The North Escarpment was not a land barrier between the Montezuma Valley and the Mesa Verde Plateau. People could move up and down the escarpment on well established trails. These prehistoric trails were used by the early Euro-American explorers, homesteaders, and by those involved in the early development of Mesa Verde National Park.

In the Mesa Verde Segment, located within the boundaries of Mesa Verde National Park, the survey area was divided into four areas of the Park: the Park Entrance (on the divide between Montezuma and Mancos Valley), Morefield Campground (Morefield Canyon), Navajo Hill-Far View (the upper portion of Chapin Mesa), and the middle portion of Chapin Mesa (from the Million Gallon Tank to Park Headquarters). Prehistoric populations were well established from Basketmaker III through Pueblo III and utilized the Park area for habitation and horticulture. Early historic uses of the Park included homesteading, grazing, and mining. More recent historic developments in the Park provide examples of a totally new type of land use in the area, one of preservation of natural and cultural resources.

Preconstruction Surveys

From 1989 through 1991, cultural resource inventories of the Mesa Verde Waterline Replacement Project, Phase III pipeline right-of-way and proposed access roads were conducted by various archaeological organizations including a private archeological company, the Bureau of Land Management (BLM), Mesa Verde National Park, and National Park Service (NPS) Midwest Archeological Center. A private archeological contractor intensively surveyed lands outside the Park in the Montezuma Valley on private and state land. These areas were the West, East, and Center Loop Access Roads and the pipeline corridor (Flint 1991a, 1991b). This survey was, for the most part, on land owned by Russel and Stanley Hindmarsh.

BLM archeologists surveyed the BLM portions of the pipeline corridor and the BLM portions of the West, East, and Center Access Road (the Center Loop and Center Access Roads were two different roads and were located in different areas) (Arrington 1991a, 1991b). Although the Center Access Road was taken out of the waterline construction contract in 1991 by Superintendent Robert Heyder, the archaeological resources discovered add to our knowledge of the settlement pattern in the Montezuma Valley Segment. All archeological field work which was conducted at the base of the North Escarpment was consistent with the standardized 60 m (200 ft) linear corridor coverage.

Archeological survey by NPS Midwest Archeological Center for Phase II and Phase III (including areas east of the Park boundary, the Mud Creek area, and the Chicken Creek area), was not conducted according to the standard 60 m wide corridor coverage (Dominguez 1990). Archeological inspection of three proposed areas within the Park (Morefield Campground, Far View, and the lower end of Chapin Mesa) conducted by Mesa Verde National Park also did not meet the standard 60 m coverage of the proposed pipeline impact (Smith 1991). All reports relating to these portions of the waterline were deficient and did not meet the Secretary of the Interior's Guidelines. There was never a complete synthesis on all of the waterline related archeological sites within the Park or outside of the Park.

Despite the deficiencies of these reports and the lack of synthesis on the archeology both historic and prehistoric, the Mesa Verde Waterline Replacement Project Phase III was scheduled for construction. At that time the federal agencies involved in this project thought that all construction aspects had been archeologically inspected. Unfortunately, this was not the case. It became clear in late January 1992, after reviewing the construction drawings, the archeological reports, and all of the correspondence, that several areas of the project had not been adequately surveyed. The problem areas included the Mancos-Chicken Creek Segment, the Park Entrance area, areas along the North Escarpment, and the lower end of Chapin Mesa. Unfortunately, the construction contract was signed and work began February 1, 1992.

Mesa Verde National Park initially hired one monitoring archeologist for the Mesa Verde Waterline Replacement Project Phase III, but as the Project escalated involving more construction spreads (a surveying crew, bulldozers to clear right-of-way, an entrencher or 235 track hoe, sheepsfoot to compact the right-of-way, pipe trucks, pipe stringers, welding rigs, pipe wrappers, and a host of operators and laborers) and additional construction activities were widely separated, it was impossible for one archeologist to cover all aspects of the construction. By mid-summer 1992, seven monitoring archeologists were working to conduct cultural resource inventories, site testing, site excavations, as well as pipeline construction monitoring.

Surveys During Construction

During the construction of the Mesa Verde Waterline Replacement Project various segments of the pipeline corridor and additional construction areas were intensively surveyed. Procedures followed those outlined in the research design. The additional construction areas were not covered in the preconstruction surveys as they were deviations from the original pipeline designs. These construction undertakings consisted of two small access road sections, pipeline reroutes, spur lines, temporary use areas (block areas) at 18 culverts and arroyo crossings, lead out ditches, two highway bore areas, blow off valves to daylight which would exceed the 60 m (200 ft) corridor, borrow areas, and a nursery area (temporary storage of right-of-way plants retrieved and used as revegetation of the easement). These construction undertakings varied in lengths and widths and were intensively surveyed during the course of the project.

Chapter 5 Section 1: Mancos Segment

During the construction phase of the Mesa Verde Waterline Replacement Project Phase III intensive survey of 18.9 ha (46.62 a) on BLM and private lands of the Mancos Segment, twelve sites were recorded and adverse effects were mitigated (5MT11731, 5MT11732, 5MT11733, 5MT11796, 5MT11797 5MT11730, 5MT11788, 5MT11789, 5MT11790, 5MT11791, 5MT11792, and 5MT11793). Adverse effects to two previously recorded sites (5MT4035 and 5MT10969) were also mitigated.

Environmental Context

The Mancos Segment of the Mesa Verde Waterline Replacement Project was located in T36N, R13W, Sections 19 and 20, in Montezuma, County, Colorado, approximately 2.7 km (1.7 mi) north of the community of Mancos in an area surrounding Chicken Creek, a tributary of the Mancos River (Figure 5.1). The pipeline replacement segment was constructed on BLM and private lands between 2103 m (6900 ft) and 2176 m (7140 ft) elevation. The western portion of the pipeline replacement crossed a series of deep, steep-sided arroyos with loosely arranged, non-stratified, sediments. The pipeline proceeded to the east upslope through Mancos Shale and pinyon-juniper forest into a northeast-southwest trending saddle between two high

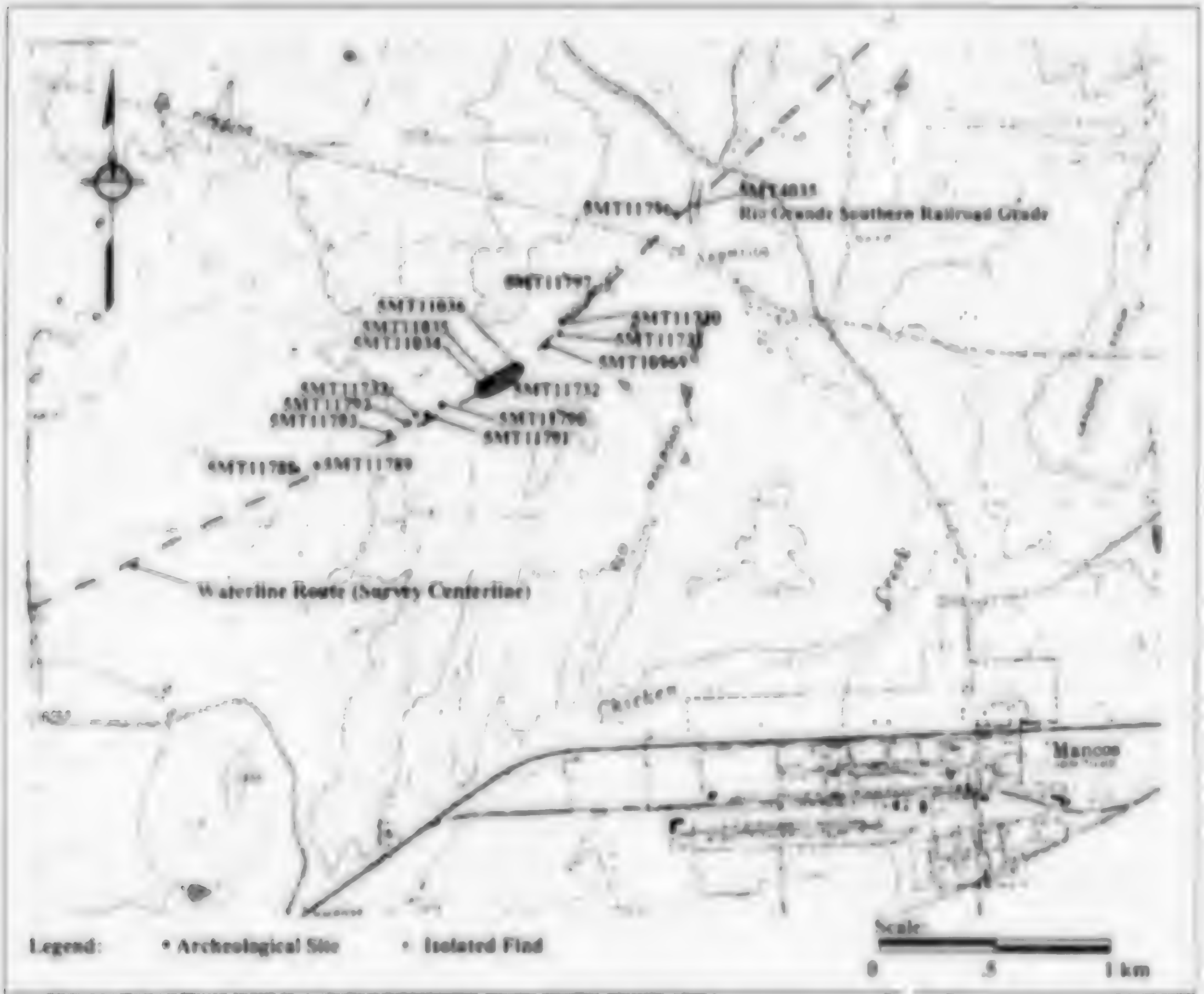


Figure 5.1. Archeological sites located and reevaluated during the survey of the Mancos Valley Segment (Mancos, Co. USGS 7.5 minute Quadrangle Map, 1973).

knolls. Vegetation in the area of the saddle included both pinyon-juniper forest and a sagebrush-greasewood-prickly pear cactus community. Although it has not been firmly established whether the sagebrush portions of the saddle had been cleared for agricultural activities during the historic settlement period in the Mancos Valley, they do not appear to be natural meadows. Continuing eastward, the pipeline crossed private lands of heavily grazed dryland pastures and irrigated pastures with Mancos Shale outcrops and pinyon-juniper forest. The pipeline continued east to the first terrace above the Chicken Creek Valley. The area was sparsely covered with pinyon-juniper and native understory. Evidence of the Mancos Shale and the Greenhorn Limestone member were present on the surface. From the Chicken Creek terrace to Highway 184, which is located at the valley bottom, the habitat was heavily grazed dryland pasture. From Highway 184, the pipeline segment crossed an irrigated pasture and Chicken Creek. The soils were alluvium derived from Mancos Shale and Dakota Sandstone.

Prehistoric Context

Within the framework established by the Colorado State Prehistoric Context (Eddy et al. 1984) the Mancos Segment is geographically located in the Mancos Drainage Unit and chronologically within the prehistoric phase sequence developed for Mesa Verde National Park (Hayes 1964).

> One of the most obvious deficiencies resulting from all the past work in the Mancos Drainage unit as a whole, is a lack of a synthesis for all these data, including those from both surveys and excavation from the Park and the adjacent areas. Several thousand sites, probably more than 6,000, have been recorded in the unit, and probably in the neighborhood of 50 to 60 sites have been excavated or extensively tested (Eddy et al. 1984:63)

Regardless of the lack of synthesis, prehistoric sites expected to occur in the Mancos Segment of the waterline right-of-way were not the large habitation sites frequently found on, or adjacent to Mesa Verde. Rather, because of the upland setting and the waterline location on a saddle between Mud Creek and Chicken Creek, the prehistoric sites expected would probably be resource procurement loci and short-term seasonal base camps of lithic and ceramic scatters. Insufficient data were available to predict the temporal period of those types of occupation. However, given the intense prehistoric occupation of Mesa Verde, many prehistoric groups would have used the area: Archaic hunters-gathers, Anasazi inhabitants from Basketmaker II through Pueblo II, and Athabascan/Shoshonean groups.

Historic Context

Historic period sites would be expected to relate primarily to Colorado Historical Contexts of Ranching (1870-1934), Farming (1867-1945) and Transportation, which reflect the early settlement of the Mancos Valley (Husband 1984). Agriculture was essential to the growth of the community with a variety of crops and fruit orchards. Irrigation in the Mancos Valley developed out of necessity in about 1876 using the natural flow of the Mancos River. By 1891 irrigation of the Valley was developed to the extent of the available water supply. As a result, one of the main factors affecting early historic settlement and land use in the Mancos Valley was the availability of irrigation water (Freeman 1958). The Rio Grande Southern Railroad was constructed through the Mancos in 1892, and furnished the first commercial freight facility. Mancos was the center of logging and lumbering from the adjacent private timber holdings and national forest (USDI BOR 1942:7). An historic trail is indicated on USGS maps dating to 1881 identified as the Navajo Road. The route of the historic trail follows in a northerly direction from Mancos toward Dolores just west of the Mesa Verde Waterline Project area, crossing the Waterline right-of-way in the vicinity of the East Fork of Mud Creek.

Previous Research in the Mancos Segment

Fifteen archeological projects had been conducted within a 6.4 km radius of the Mancos Segment of the Mesa Verde Waterline Replacement Project (Table 5.1), according information obtained from a 1992 search of the site records, microfiche land records, cultural resource management reports and survey maps at the BLM San Juan Resource Area Office, Durango and the State Historic Preservation Office. These archaeo-

Table 5.1 Cultural Resource Inventories Within 1.6 km of the Mancos Segment of the Mesa Verde Waterline Replacement Project

Author, Date	BLM Report #	Type of Survey	Sites
Arrington, K 1977	BLM7724, Vincent #5	Well Pad	0
Arrington, K 1979	BLM7936, Empire Electric 115 KV Powerline	Small Block	5MT11430
Biggs 1982	BLM8283, Ambra Oil	Well Pads/Roads	0
Bulinski, K 1988	BLM88028, Mountain Bell Telephone Line	Small Linear	0
Chandler, S., et al 1979	BLM7947, BLM Sacred Mountain Planning Unit	Sample Survey	5MT4811
Dominguez, S. 1990	BLM90223A, Mesa Verde Waterline Easement Phase II	Large Linear Pipeline	5MT10969-11070, 5MT11028-11040, 5MT11042-11046, 5MT11048-11049
Fetterman, J., L. Honeycutt 1980	BLM8039, MAPCO's Rocky Mountain Liquid Hydrocarbons Pipeline	Large Linear Pipeline	5MT6044
Fetterman, J., L. Honeycutt 1981	BLM8143, Shell CO_2 Mainline Pipeline	Large Linear Pipeline	0
Gooding, J. 1986	BLM86, Mancos North Highway Project	Linear Road	0
Hardin, P 1985	BLM8076, Geoquest Exploration Inc. Seismograph Line	Seismic Lines	0
Honeycutt, L., J Fetterman 1986	BLM86047, Montezuma County Sanitary Landfill	Small Block	5MT9736-9740
Honeycutt, L., J Fetterman 1991	BLM91, Northwest Pipeline Corporation System Expansion Project	Large Linear Pipeline	5MT11428-11430
McCargo 1994	BLM94, Department of Transportation State Highway 160 near Mancos	Linear Road	0
Nickens, P 1986	BLM86, Rifle-San Juan Transmission line	Large Linear	5MT4035
Smith, J 1991	BLM91, Mesa Verde Waterline Right-of-Way	Small Linear Pipeline	0

logical project surveys documented 33 sites in the vicinity of the Mancos Segment (Appendix B Table B.1).

Discussion of Previous Projects Within 1.6 km of the Mesa Verde Waterline in the Mancos Segment

Only seven of the 15 previous archeological projects within 1.6 km of the Mesa Verde Waterline in the Mancos Segment reported archeological sites. Isolated finds, procurement camps, historic homesteads, and the historic railroad grade were the types of sites found.

The most comprehensive survey was conducted for the Montezuma County sanitary land fill on a 20 ha (50 a) block area in NE 1/4 Section 30, T36N, R13W (Honeycutt and Fetterman 1986). One historic homestead site (5MT9736) was recorded which was occupied from 1933 to 1939. An isolated find type site, 5MT9737, consisted of one 1-hand mano, one trough metate, one pot drop with 50+ grayware sherds, two cores of Mancos hornfels (silicified siltstone), and one flaked lithic debitage of silicified sediment. Additional isolated finds were recorded: 5MT9738 (two river cobble axes which were pecked and grooved), 5MT9739 (one quartzite hammerstone, one silicified sediment core, and one river cobble notched axe), and 5MT9740 (two river cobble manos, with one used as a pitted pounding stone).

In another survey conducted for the Rifle-San Juan transmission line, the Rio Grande Southern Railroad Grade was located (Nickens 1986). The linear survey from point location #41 to U.S. Highway 160 recorded 5MT4035 the Rio Grande Southern Railroad grade constructed and designed by Otto Mears from 1890-1899.

One plain grayware ceramic was noted during an examination of cultural resources for Empire Electric 115 KV power line conducted by the BLM (Arrington 1979) in the Mancos Segment area.

A Pueblo II lithic and ceramic scatter (5MT4811) was recorded during a Class II cultural resources inventory of the BLM's Sacred Mountain Planning Unit (Chandler et al. 1979) in an 80 acre BLM sample block in the Mancos Segment area.

An isolated piece of flaked lithic debitage (5MT6044) was located in the Mancos Segment during a cultural resource inventory of MAPCO's Rocky Mountain Liquid Hydrocarbons Pipeline Project, southwestern Colorado (Fetterman and Honeycutt 1980).

An historic site and 9 isolated finds were located in the Mancos Segment in 1990 by the NPS Midwest Archeological Center cultural resource inventory of the existing Mesa Verde waterline easement (Phase II) from the Park's east boundary, near the entrance area to Highway 184 north of Mancos, Colorado (Dominguez 1990). The project area included all of the right-of-way from Section 32, T36N, R14W to the intersection with Highway 184 in Section 20, T36N, R14W. From west to east the project area included portions of Sections 33, 34, 35, 26, and 25 T36N, R14W, and portions of Sections 30, 19, and 20 of T36N, R13W. The survey covered a 40 m wide corridor (20 m to either side of the existing right-of-way).

Three isolated finds were recorded within 1.6 km of the Mancos Segment during a cultural resource inventory conducted for the Northwest Pipeline Corporation System Expansion Project, which paralleled the MAPCO's Rocky Mountain Liquid Hydrocarbons Pipeline (Honeycutt and Fetterman 1991). Both pipelines are located in the same corridor.

Mesa Verde Waterline Replacement Project Phase III Intensive Inventory in the Mancos Segment

Highway Bore

On August 8, 1992, a Class III cultural resource inventory was conducted along Highway 184 for a proposed highway bore. The location of the highway bore was in SW 1/4, NE 1/4, NE 1/4, NE 1/4, Section 20, T36N, R13W. All lands involved in this undertaking were privately owned.

Because of the unusual nature of the highway bore, a much greater area was to be impacted than had been surveyed during preconstruction work. The area was a staging area for heavy equipment, trucks, pipe and personnel as well as the construction of a Pressure Reducing Valve Station #3. The area to be impacted by construction activities was indicated by the construction foreman using stakes and flagging tape to demarcate the survey boundaries on either side of the highway. All construction activities were restricted to the limits of the archeological survey boundaries. The total area surveyed for the east side of Highway 184 was 5,771 m² (1.42 a). For the west side of Highway 184 the total area surveyed was 6,017 m² (1.5 a). No cultural resources were observed in the 1.2 ha (2.92 a) on the surface for either side of the highway bore. A monitoring archeologist was present during all phases of construction. During the construction, no subsurface cultural remains were observed.

Resurvey of the Pipeline Corridor

The pipeline corridor in the Mancos Segment had to be resurveyed because the previous archeological work had covered only a 40 m width of the NPS easement through private and BLM lands (Dominguez 1990). From August 18-21, 1992 Mesa Verde Waterline archeologists surveyed intensively along an expanded corridor width of 60 m (30 m on either side of center line). The only provisions for staking of the right-of-way corridor were a 10.7 m (35 ft) construction right-of-way with approximately half of the boundary stakes missing and an occasional pin-flag indicating the location of the existing waterline. The portion of the waterline corridor that was resurveyed began approximately 800 m (2625 ft.) east of County Road 39 continued eastward to Highway 184, and went from Highway 184 approximately 305 m (1000 ft) eastward just beyond Chicken Creek. The linear distance for this segment was 2950 m (9678 ft/1.8 mi). A total area of 17.7 ha (43.7 a) was surveyed along the pipeline corridor during the Mesa Verde Waterline Replacement Project Phase III in the Mancos Segment project area..

Five prehistoric sites (5MT11731, 5MT11732, 5MT11733, 5MT11796, and 5MT11797) and seven isolated finds (5MT11730, 5MT11788, 5MT11789, 5MT11790, 5MT11791, 5MT11792, and 5MT11793) were discovered on the expanded right-of-way (Table 5.2). One historic transportation site (5MT4035) and

Table 5.2. Mancos Segment Newly Recorded and Reevaluated Sites and Isolated Finds

Site Number	Elevation	Cultural Affiliation	Site Type	Site Function
5MT11730	2174 (7130)	Archaic/Basketmaker II	Isolated Find	Projectile Point
5MT11731	2186 (7170	Archaic/Basketmaker II	Lithic Scatter	Seasonal Procurement Camp
5MT11732 (5MT11034-11036)	2159 (7080)	Archaic/Basketmaker II / Pueblo	Lithic/Ceramic Scatter	Seasonal Procurement Camp
5MT11733	2134 (7000)	Archaic/Basketmaker II/ Pueblo	Lithic/Ceramic Scatter	Seasonal Procurement Camp
5MT11788	2110 (6920)	Prehistoric	Isolated Find	2-hand mano
5MT11789	2110 (6920)	Prehistoric	Isolated Find	2 manos, flake
5MT11790	2149 (7050)	Prehistoric	Isolated Find	End scraper
5MT11791	2146 (7040)	Prehistoric	Isolated Find	Rubbing Stone
5MT11792	2146 (7040)	Prehistoric	Isolated Find	Core
5MT11793	2120 (6960)	Prehistoric	Isolated Find	Flake
5MT11796	2171 (7120)	Archaic/ Basketmaker II	Lithic Scatter	Seasonal Procurement Camp
5MT11797 (5MT11037)	2171 (7120)	Basketmaker III	Lithic/Ceramic Scatter Hearth	Seasonal Habitation Camp
5MT4035 reevaluated	2171(7120)	Historic 1890-1899	Rio Grande Southern Railroad Grade	Railroad Grade-Railroad Bed
5MT10980 reevaluated	2177 (7140)	Historic 1900-1930s	Historic Homestead	Farming
Total = 14				

one historic homestead site (5MT10969) were reevaluated. Three isolated finds recorded in an earlier survey (5MT11034, 5MT11035, and 5MT11036) were included in site assemblage of 5MT11732. Isolated find 5MT11037 was included in the site assemblage of 5MT11797.

Discussion of Archeological Sites Recorded and Reevaluated in the Mancos Segment

In the Mancos Segment of the Mesa Verde Waterline Replacement Project Phase III during the construction surveys five sites and seven isolated finds were discovered as a result of the resurvey of the 17.7 ha (43.7 a) of the waterline corridor in the Chicken Creek area and two historic sites were reevaluated. Of the five prehistoric sites, three seasonal procurement camps (5MT11731, 5MT11732, and 5MT11733) were eligible for the National Register and were tested. The testing and mitigation of the sites and reevaluations of historic sites 5MT4035 (Railroad Grade) and 5MT10969 (Historic Homestead) are reported in this document in the chapter on Mancos Segment Testing and Excavation. The seven isolated finds are not eligible for the National Register because of the limited information contained in them. The remaining two sites (5MT11796, lithic scatter, and 5MT11797, artifact scatter and hearth) are described in this chapter.

Isolated Find Sites 5MT11730, 5MT11788, 5MT11789, 5MT11790, 5MT11791, 5M11792, 5MT11793

Of the seven isolated find sites, an Archaic-Basketmaker II projectile point at 5MT11730 had the most chronological information (Figure 5.2). A 2-hand mano was found at 5MT11788. Two manos and a flake were found at Site 5MT11789. Flaked lithic materials were found at Site 5MT11790 (end scraper), 5MT11792 (core), and 5MT11793 (flake). A rubbing stone was found at 5MT11791.

Site 5MT11796, Lithic Scatter

Site 5MT11796 consisted of a large flaked lithic and nonflaked lithic scatter located on northwest-southeast trending ridge slope. The ridge is located on the western upper bench of a terrace overlooking the Chicken Creek drainage. The site dimensions were 66 m E-W by 46 m N-S. The site was located in a fairly open area of scattered juniper and scrub-oak. Dense pinyon-juniper forest surrounded the site. The pipeline right-of-way bisected the site along a northeast-southwest trending corridor (Figure 5.3). Groundstone, (mainly biscuit mano fragments) was concentrated to the north and west along the upper ridge slope. Material types included sandstone, andesite/diorite, and river cobbles. Nonflaked lithic fragments were both oxidized and unoxidized. The oxidized fragments showed heat spalling, crazing, and abrasions. Four metate fragments were of tabular sandstone. Flaked lithic materials consisted of flaked lithic debitage, three quartzite utilized flakes, and flaked lithic tools. The debitage material types observed consisted of quartzites, cherts, and jasper. Lithic tools such as a quartzite projectile point, two bifaces (chert and quartzite), and two quartzite cores were found on the surface (Figure 5.4). No surface features, stains, or depressions were observed. The artifact assemblage included both high and low input tools representing a hunting and gathering strategies of processing and resource procurement. Based on the form of the artifact assemblage, this site was probably utilized during the Archaic period.

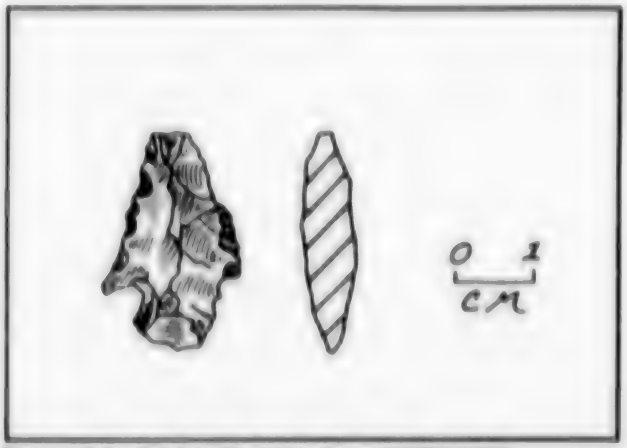


Figure 5.2. Projectile point from 5MT11730.

More data is needed from 5MT11796 to assess its eligibility for the National Register of Historic Places. It may yield information on the prehistoric resource procurement strategies utilized along the foothills of the La Plata Mountains by indigenous inhabitants. The site was located on private land and was never tested. Only the artifacts found within the right-of-way were collected and analyzed.

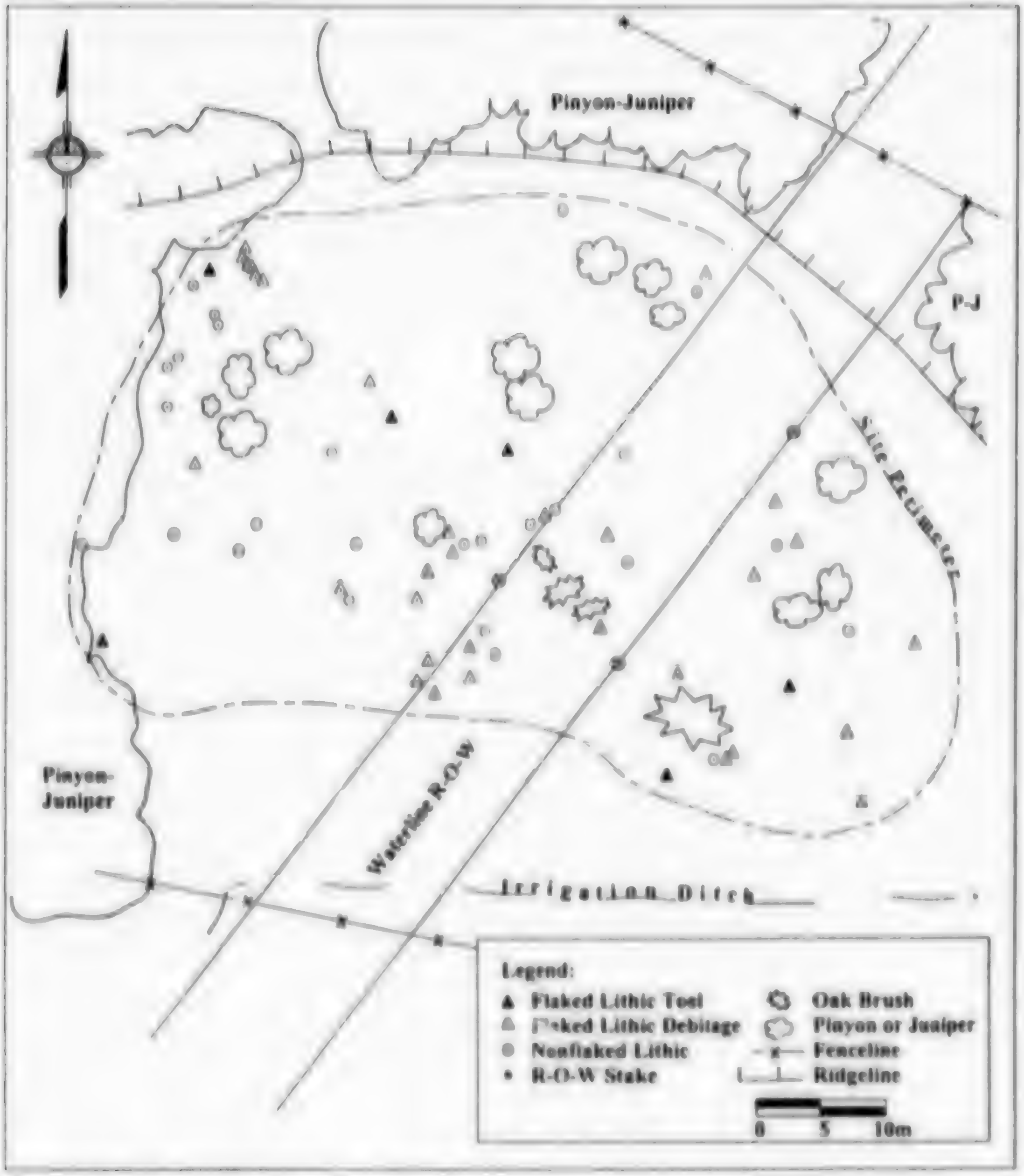


Figure 5.3. Site 5MT11796 plan view.

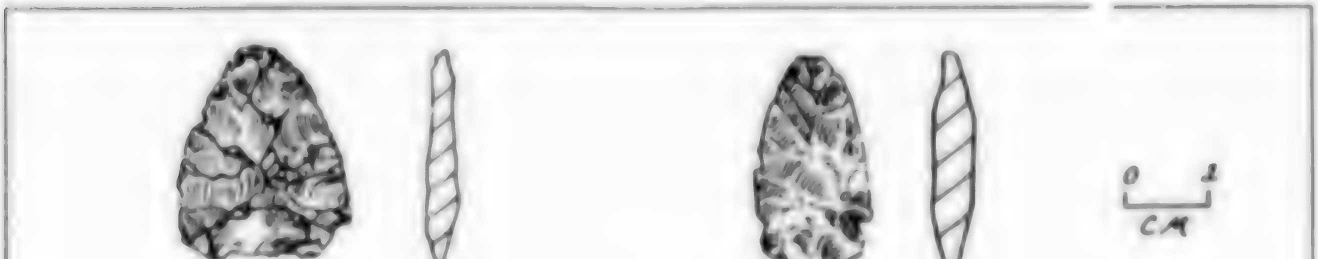


Figure 5.4. Flaked lithic tools from 5MT11796; (a) PL 17, chert biface; (b) PL 18, quartzite projectile point.

Site 5MT11797, Artifact Scatter and Hearth

Site 5MT11797 consisted of lithic, ceramic, and nonflaked lithic scatter and a deflated hearth (Feature 1) located on a southwest slope of a northwest-southeast trending ridge covered by pinyon-juniper forest. The site dimensions were 60 m NW-SE by 25 m NE-SW. The pipeline right-of-way bisected the site northeast to southwest (Figure 5.5). The lithics contained high and low input tools such as flaked lithic debitage, utilized flakes, and flaked lithic tools. The debitage material types consisted of silicified siltstone, Morrison quartzite, and chert. Two utilized flakes of Brushy Basin chert and Morrison chert were observed. A Morrison quartzite projectile point midsection, a Burro Canyon chert biface fragment, two cores (Morrison quartzite and chert), and a denticulate scraper (made from a fossilized clam shell) were observed on the surface. Three sandstone mano fragments were found. No metates were found. Early Pueblo grayware sherds were found on the northern portion of the site. Feature 1, a deflated hearth 3 m in diameter, was located on the southwestern slope of the site with 15 to 20 fractured and heat crazed tabular oxidized sandstone fragments. Approximately 10 m upslope from Feature 1 a piece of vitrified adobe fragment (jacal) was observed. Based on the presence of the adobe fragment, the hearth, and Early Pueblo grayware ceramics, the site may represent a Basketmaker III seasonal habitation or base camp.

More data on Site 5MT11797 is needed to assess its eligibility for nomination to the National Register of Historic Places. The site may yield information on prehistoric seasonal use in the Mancos Drainage Unit. The site was located on private lands and was never tested. Only the artifacts that were within the pipeline right-of-way were collected and analyzed.

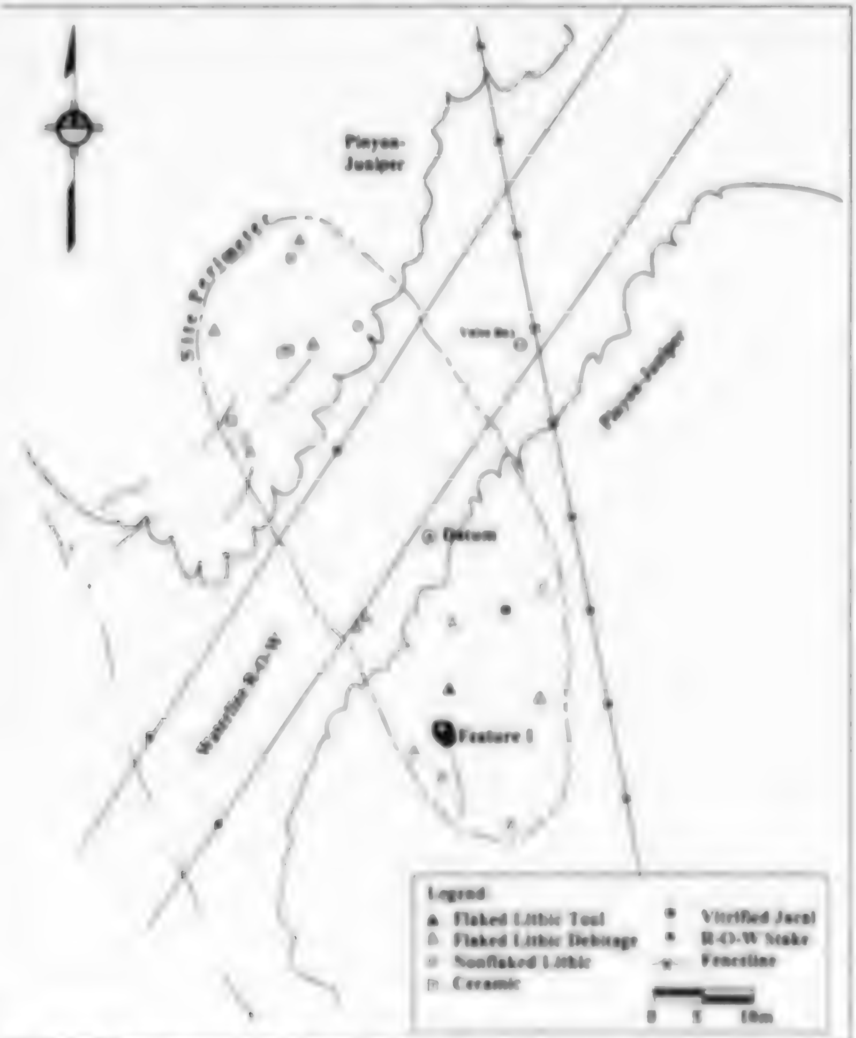


Figure 5.5. Plan map of Site 5MT11797.

Prehistoric Settlement Pattern and Land Use in the Mancos Segment

The seven isolated finds (5MT11730, 5MT11788, 5MT11789, 5MT11791, 5MT11792, 5MT11793) discovered during the Phase III intensive survey have limited information but their physical location and artifact types are important to understanding the overall settlement pattern and human land use. Most of the isolated artifacts found in the surveys of 1990 and 1992 were high input tools which indicated activities related to hunting, gathering, processing, and procuring the floral and faunal resources of this upland area. The site data compliment that found on other surveys in the area (Honeycutt and Fetterman 1986) to demonstrate a widespread use of the Chicken Creek uplands.

It may have been the fact that water was available in Chicken Creek to the east and Mud Creek to the west that the three resource procurement camps 5MT11731, 5MT11732, and 5MT11733 show some long term usage of the terraces, ridge slopes and saddles of the small drainage divide. Evidence of fire-cracked rock was present on every prehistoric site.

The Mancos Segment prehistoric sites consisted of sparse lithic and groundstone artifact scatter spread over a wide area. Artifact clusters (areas with high-density of artifacts) were observed within the site boundaries at 5MT11731, 5MT11732, 5MT11733, and 5MT11796. Site data, including the chronologically significant projectile point (5MT11730), reflect that late Archaic/Basketmaker II peoples utilized the uplands of the Mancos Segment area, possibly seasonally, living in base camps. Three sites (5MT11732, 11733 and 11797) contained sparse quantities of ceramics. Due to weathering, erosion, and disturbance from the homesteading activities during the historic period, very few hearths remained. There were no surface indications to suggest that these sites were permanent habitations, no cultural stains or depressions to indicate a possible buried pithouse or kiva, and no evidence of a midden with dense artifact remains indicating long term use. The tools from the surface assemblage at each site indicated that these peoples were procuring the plant, animal, and mineral resources of this area. There was ceramic evidence that the Anasazi of the Pueblo period also utilized the Mancos Segment area, living in seasonal base camps or seasonal habitation sites. The types of ceramic materials found indicate the Anasazi use of the Chicken Creek uplands during the Basketmaker III and Pueblo I periods for hunting and gathering rather than permanent habitation. This information fits well with data from previous surveys, particularly site 5MT9737 which consisted of a 1-hand mano, a trough metate, a cluster of 50+ grayware sherds, two cores of Mancos Hornfels, and one flaked lithic debitage of silicified sediment. (Honeycutt and Fetterman 1986)

Historic Settlement Patterns and Land Use in the Mancos Segment

The historic sites reevaluated during the Mesa Verde Waterline Project in the Mancos Segment also met the expectations of the research design in historic contexts of Ranching, Farming, and Transportation. The historic homestead (5MT10969) fits within the Ranching and Farming Context and the railroad grade (5MT4035) represents the development of transportation in southwestern Colorado. The Plateau Country remained a relatively isolated region until the Rio Grande Southern Railroad was constructed in the 1890-1899. The impact of this railroad network brought growth to the region and to the communities in Montezuma County. The railroad changed the social, economic, and political climate of this area.

The historic Navajo Road between Mancos and Dolores which was identified on the 1881 USGS map was significant to the Mancos Valley, in that the trail provided access, trade, and communication to the surrounding towns that began to develop in Montezuma and La Plata County in the late 1800s and early 1900s.

Summary of Mancos Segment Survey

The cultural resources located during the intensive survey of 18.9 ha (46.62 a) on Bureau of Land Management and private lands of the Mancos Segment were similar to those 33 sites previously recorded in the area. Five sites (5MT11731, 5MT11732, 5MT11733, 5MT11796, 5MT11797) discovered during the construction of the Mesa Verde Waterline Replacement Project Phase III were investigated and adverse effects were mitigated. Seven isolated artifacts were also found and evaluated on the survey (5MT11730, 5MT11788, 5MT11789, 5MT11790, 5MT11791, 5MT11792, and 5MT11793). Two previously reported sites (5MT4035 and 5MT10969) were reevaluated.

Chapter 5 Section 2: Montezuma Valley Segment

The Montezuma Valley Segment of the Mesa Verde Waterline Replacement Project was bordered on the north by U.S. Highway 160, by Mesa Verde National Park on the south and east, and on the west by the right-of-way for the West Access road. Parts of the 9.7 km (6 mi) long 60 m wide pipeline right-of-way and 7.7 km (4.8 mi) of access roads in this segment were surveyed and all areas were monitored during construction. An additional 18.6 ha (46.04 a) were intensively surveyed and monitored during construction. In the Montezuma Valley Segment. Ten archeological sites (5MT11668, 5MT11706, 5MT11708, 5MT11709, 5MT11710, 5MT11711, 5MT11712, 5MT11727, 5MT11728, and 5MT11729) and 10 isolated finds (5MT11707. 5MT11713. 5MT11714, 5MT11715, 5MT11716, 5MT11717, 5MT11718, 5MT11724, 5MT11725, and 5MT11726) were discovered during the construction phase of the Mesa Verde Waterline Replacement Project Phase III (Figure 5.6).

The 9.7 km (6 mi) pipeline right-of-way in this segment began on the western edge of the Park boundary beyond the divide between the Montezuma and Mancos Valleys. The pipeline right-of-way continued on BLM lands westerly to southwesterly in Section 31, T36N, R14W through the northwest corner of Section 6, T35N, R14W. The right-of-way continued on in a southwestern direction in Section 1, T35N, R15W owned by the State of Colorado, Russel Hindmarsh and BLM. The pipeline right-of-way continued southwest across Sections 11 and 10, T35N, R15W through lands owned by Russel Hindmarsh and BLM. It then turned south in Section 15, T35N, R15W and ended at the Park boundary.

Three access roads necessary for the Mesa Verde Waterline Replacement Project were located in the Montezuma Valley Segment: the East Access Road, the Center Loop Access Road and the West Access Road. The East Access Road began at U.S. Highway 160 in Section 26, T36N, R15W (owned by Stanley Hindmarsh) and traversed in a southeasterly direction through Sections 25, 36, T36N, R15W, and the northwestern corner of Section 31, T36N, R14W, continued through BLM lands to the waterline right-of-way. The total length of the East Access Road was 3.9 km (2.4 mi). The Center Loop Access Road was a small 1.8 km (1.1 mi) loop which skirted along a steep ridge between the waterline easement. This loop was located in Sections 10 and 11, T35N, R15W. The West Access Road was 3.7 km (2.3 mi) long. It began at County Road H west of the Trap Club and traversed to the south and then turned in a southeasterly in Sections 5, 4, and 9, T35N, R15W (USGS Cortez 7.5' quad), crossing Russel Hindmarsh and BLM lands. The road continued southeasterly to the waterline right-of-way in Sections 10 and 15, T35N, R15W (USGS Point Lookout 7.5' quad).

Environmental Context

The Montezuma Valley Segment was located in the southeastern portion of the McElmo Drainage on the eastern edge of the valley. The drainage system flows northwest into McElmo Creek in the entire area from tthe North Escarpment of Mesa Verde to U.S. Highway 160. The ridges are northwest-southeast trending and the dipslope of the ridges is to the northwest. The vegetation includes sagebrush, pinyon-juniper and scrub oak. Soils are those derived from the Mancos Shale Formation with some small pockets of red loess.

Prehistoric Context

The prehistory of the Montezuma Valley fits within the temporal framework of North American Prehistory and the Pecos Classification of the southwestern Formative (Nickens 1982). The Montezuma Valley Segment of the project area is located in the southeasterly portion of the McElmo Drainage Unit (Eddy et al. 1984).

Within the Montezuma Valley Segment no known Paleoindian sites or isolated finds have been documented. Archaic sites have mainly been recorded in the higher elevations within other parts of the Montezuma Valley.

Anasazi Basketmaker II period (A.D. 1-450) sites and isolated finds are fairly minimally documented within the McElmo Drainage Unit but the entire unit has not been inventoried. Within the Montezuma Valley Segment one Basketmaker II style projectile point was found during the project work.

The number of Basketmaker III period sites indicates a sizable population for the McElmo Drainage Unit

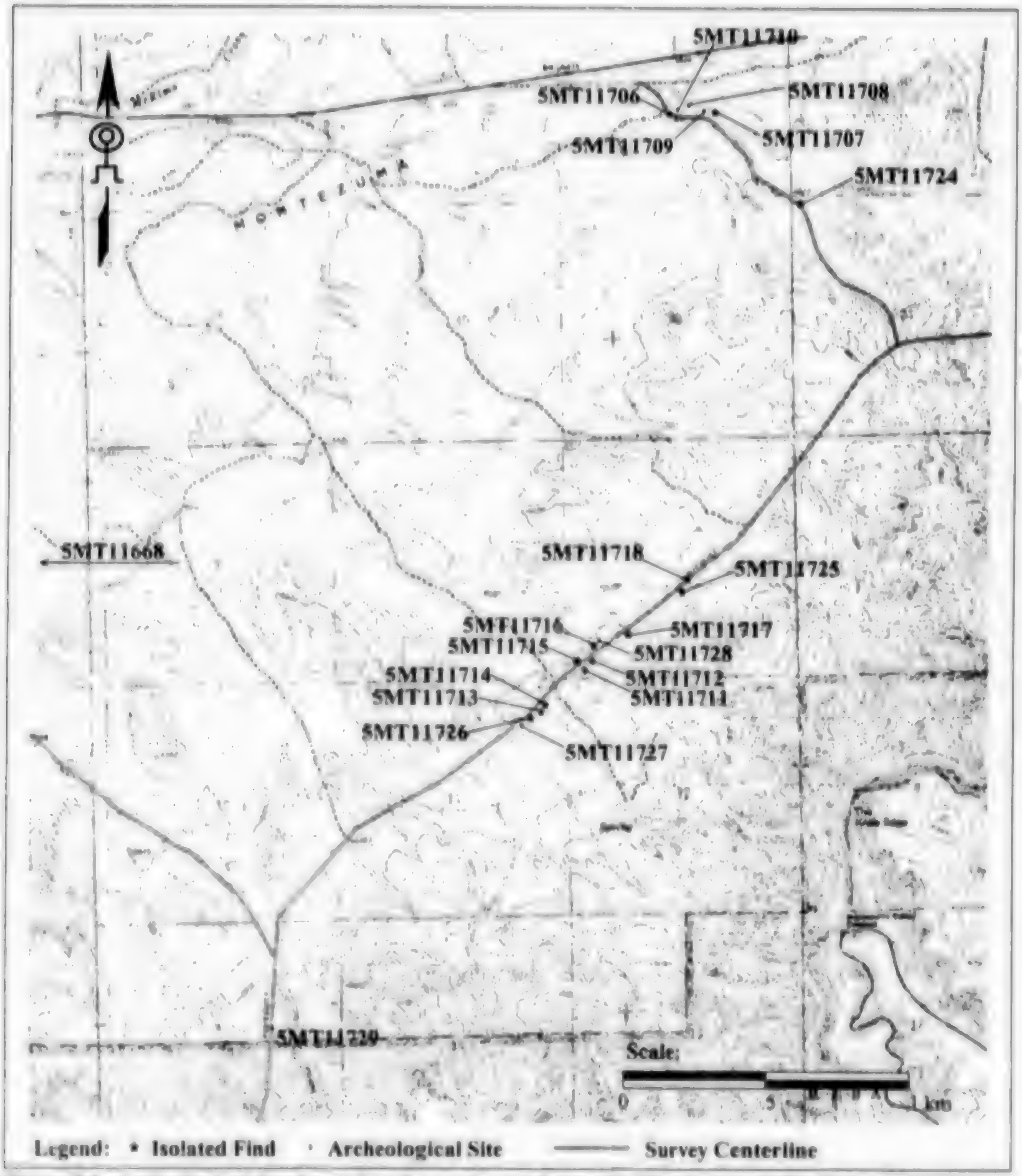


Figure 5.6. Archeological sites located and reevaluated during the Montezuma Valley Segment survey (Point Lookout, Co. USGS 7.5 minute Quadrangle, 1973).

from A.D. 450-750. Basketmaker III sites in the project area exhibit two contrasting patterns in the architectural layout. The first pattern is that habitation sites consist of one to two pithouses with antechambers, associated surface and storage rooms. The second pattern is of the complex aggregated sites consisting of multiple pithouses, surface rooms, ramadas, storage cists, and miscellaneous structures and features. Complex sites may include a protective stockade and some are reported as large Basketmaker III villages including a "great pithouse". There may be a temporal distinction between the two patterns. "The single/double pithouse sites may be earlier (A.D. 550-650) and the more complex sites may be slightly later (A.D. 650-

700)" (Eddy et al. 1984: 36). Ceramics found in sites of this period are plain smooth surfaced graywares, Chapin Gray, and Chapin Black-on-white.

The Pueblo I period (A.D. 750-900) appears to be one of population consolidation and decline within the McElmo Drainage Unit. Possibly due to drier and warmer conditions, the population appears to have moved to higher elevations with the McElmo Drainage (Eddy et al. 1984:38). Pueblo I architecture is distinguished from the Basketmaker III period with the introduction of an arc of contiguous above-ground jacal room suites with several deep pithouses. The pithouse no longer has an antechamber but has a ventilator shaft in the southern portion of the pitstructure. Chapin Gray and Chapin Black-on-white are still manufactured but additional ceramic types occur: Moccasin Gray and Mancos Gray (neck-banded graywares) and Abajo Red-on-orange (a trade ware from the southeastern Utah area).

The Pueblo II period (A.D. 900-1100) appears to be characterized by population movement and shifts in settlement patterns within the McElmo Drainage Unit (Eddy et al. 1984:38-39). Aggregated villages were abandoned and replaced by a dispersed pattern of small pueblos. Population continued to rise, but there was a shift from the low numbers of large villages to larger numbers of smaller pueblos, with an even greater increase in the numbers of seasonal sites and limited activity areas. With the expansion of Pueblo II sites, the population seems to have adopted new subsistence technologies in the form of intensive agricultural methods such as the construction of reservoirs, canals, terraces and check dams. The Pueblo II period is distinguished by the appearance of true-above ground masonry structures along with a pitstructure that can be defined as a kiva rather than a habitation. Corrugated grayware ceramics appear and gradually replace the plain and neck banded graywares. Cortez Black-on-white becomes the dominant decorated ware during the early portion of the Pueblo II period (A.D.900-975). By the latter part of the period (A.D. 975-1100) Mancos Black-on-white is predominant.

The site density and population increased in the Pueblo III period (A.D. 1100-1300) in the southern and western canyon zones of the McElmo Drainage Unit. The large aggregated villages established in the Pueblo II period continued. These villages contained structures such as great kivas, towers and numerous residental structures. A severe region-wide drought began approximately A.D. 1130 and lasted until A.D. 1180. This environmental factor may have been responsible for the population movement and decline within the McElmo Drainage Unit. In most areas of the unit the habitations are found in the cliffs and canyons with the few exceptions. Population appears to be greatly reduced in the mesa tops and by the late A.D. 1200s most of the small pueblos have been abandoned. Villages, on the other hand, appear to have continued on until the middle A.D. 1200s. The Pueblo III period was short-lived and the McElmo Drainage Unit was probably abandoned before A.D. 1300 (Eddy et al. 1984:40-43).

After the abandonment of the Anasazi approximately A.D. 1300, the McElmo Drainage Unit was undoubtedly severely damaged due to resource depletion, environmental factors, the disintegration of the trade network, and population stress. It is thought that the McElmo Drainage Unit was uninhabited for a fairly long time, until the ancestors of the Shoshonean and Athabaskan speaking tribes, the modern *Noochee* (Ute) (Conetah 1982:25) and the *Dineh* (Navajo) came into the valley proper. Archeological evidence of these migrating bands has not yet been found in the Montezuma Valley. The histories and oral traditions of the *Nooche* and *Dineh* passed down from generation to generation state that they have always lived here.

Historic Context

The Montezuma Valley Segment fits within the historic contexts of Spanish Exploration, Ranching, Farming, and Early Transportation in the early 1900s (Husband 1984).

The earliest European contact in the area was by the Spanish exploration parties, as early as 1761, seeking the rumored mineral wealth of the region. It has been documented that the Spanish traded with the Utes. By 1776 a second expedition in search of a new land route to California came into southwest Colorado establishing Spanish trails which were used by the latter trappers and pioneers. From 1800 to approximately the 1840s the fur trappers entered into the area. The first Colorado gold rush began in 1859 with miners exploring the area for precious metals. The Hayden surveying expedition began in 1873 in the area (Husband 1984:1-4). By 1874 Euro-American pioneers appeared in the Mancos and Montezuma Valleys establishing the communities of Mancos in 1874 and Cortez in 1886 (Freeman 1958).

Previous Research in the Montezuma Valley Segment

Twenty-two archeological inventories were completed within a 1.6 km radius of the waterline and access road easements in the Montezuma Valley Segment according to a 1995 review of records at the Bureau of Land Management, San Juan Resource Area Office; BLM Anasazi Heritage Center; and the Colorado State Historic Preservation Office (Table 5.3). In all there were 118 previously reported archeological sites within 1.6 km of the Montezuma Valley Segment study area (Appendix B Table B.2).

Four of the previous cultural resource inventories were conducted in connection with the preconstruction phase of the Mesa Verde Waterline Replacement Project Phase III (Arrington 1991a, Arrington 1991b, Flint 1991a, Flint 1991b). A separate inventory was also conducted near the West Access road in 1990 in connection with a proposed livestock pond in T35N, R15W, Sections 9 and 10 (Arrington 1990). During the survey, 5MT10834, a multi-component Basketmaker III-Pueblo II site, was recorded (Arrington 1990). The site was tested during the Waterline Replacement Project.

The first Class III archeological inventory for the preconstruction phase of the Mesa Verde Waterline Replacement Project Phase III in the Montezuma Valley Segment was conducted along BLM portions of a proposed Center Access Road in T35N, R15W, Sections 2 and 11. The plans for construction of a Center Access road were removed from the project after the area was surveyed. A 61 m wide corridor of the existing road was surveyed for a distance of 1.8 km (1.11 mi) (Arrington 1991a). Three sites were found in the 5.5 ha surveyed. Site 5MT10597 was a Pueblo II lithic and ceramic scatter with five burned clusters of sandstone . Site 5MT10600 had two components, the first was a Pueblo II habitation consisting of a rubble mound with a depression 17 m in diameter, the second was an historic 1900-1935 open range land livestock camp. The third site found, 5MT10868, was a Basketmaker III-Pueblo I ceramic and small scatter of unshaped sandstone.

The second preconstruction survey conducted as part of the Mesa Verde Waterline Replacement Project, Phase III, was along existing NPS waterline segments which were located on BLM-managed lands (Arrington 1991b). These segments were located in T35N, R15W, Sections 1, 10, 11, and 15; T35N, R14W, Section 6, and T36N R14W, Sections 31 and 32. A 61 m (200 ft) wide corridor, 30 m (100 ft) on either side of the buried pipeline was inventoried. A total of 6729 m (20,600 ft), and 76.6 ha (189.2 a) of the waterline were surveyed. Three prehistoric sites and one isolated find were recorded on BLM-managed lands. Site 5MT10594 was originally recorded as a Pueblo II short term habitation field house. The site was excavated in 1992 and 1993 as part of the Waterline Replacement Project and it was found that the site was a Basketmaker III-Pueblo I long term habitation site with 3 surface rooms, 3 storage rooms, two pithouses and a midden. Site 5MT10595 was originally recorded as a Pueblo II lithic and ceramic scatter with scattered stone. This site was also tested during the waterline project in 1992 and 1993 and found that the site was a Pueblo II long term habitation consisting of five rooms and a kiva. Two other sites were found on the survey: 5MT10598, a Basketmaker III-Pueblo I habitation site, and 5MT10596, an isolated find ceramic concentration (Arrington 1991b).

The third cultural resource inventory associated with the preconstruction surveys for the Mesa Verde Waterline Replacement Project Phase III was conducted on the existing waterline right-of-way, from the Park's Entrance Trailer southwesterly to the North Rim of Mesa Verde National Park (Flint 1991b). The total distance of the survey was 9.2 km (5.8 miles). The survey covered the corridor width of 61 m (200 ft), 30 m (100 ft) on either side of the staked alignment. The location of the project area including the section in the Park Entrance Area was in T36N, R14W, Sections 31 and 32; T35N, R14W, Section 6; T35N, R15W, Sections 1, 2, 10, 11, 12, 15 and 22. Land ownership and management along the pipeline right-of-way varied with federal agencies, State of Colorado, and a private land owner. The pipeline segment within the Park Entrance Area was 1.6 km (1 mi) and no cultural resources were recorded along that segment. Total area covered was

Table 5.3. Cultural Resource Inventories Within 1.6 km Radius of Montezuma Valley Segment

Author, Date of Publication	BLM Report ID#	Type of Survey	Sites in Project Area
Lucas, B. 1971	7102. Dolores Grazing District Survey	Intensive Block	5MT1926-1930, 5MT1961-1962, 5MT1967-1969, 5MT1972
Arrington, R. 1979	798. San Juan Basin Vo Tech	Large Block	5MT4697
Chandler, S. et al. 1979, 1980	7987. Sacred Mountain Planning Unit Survey	Large Block	5MT5071, 5MT5247-5249
Arrington, R. 1980	8061. Rabbit Edge Fire Suppression	Small Block	5MT5681
Arrington, R. 1980	8062. Ambra Oil	Well Pad/Access Road	0
Horvath 1982	8210. Shell Oil	Seismic Line	5MT7277
Biggs, R.W. 1982	8281. Ambra Oil	Well Pads/Access Roads	0
Biggs, R.W. 1983	8318. Woodley Oil	Well Pad/Access Road	0
Biggs, R.W. 1983	8389. Woodley Oil	Well Pad/Access Road	0
Flint, P. 1984-1990	8401b. Hindmarsh Project	Large Block	5MT9747-9748, 5MT9815, 5MT10478-10490, 5MT11324-11329
Moore, R.A. 1984	84013. AB Green Co	Well Pad/ Access road	5MT8339-8352
Conroy, J. 1985	85. BLM staff	BLM survey	5MT8804
Kuckelman, K. 1986	86. CASA Highline Ditch	Large Linear	5MT8923-8925, 5MT9304-9308
Arrington, K. 1989 (Arrington, R. 1991a)	89071. Center Access Road, Mesa Verde Waterline Proposal	Small Linear Access	5MT10597, 5MT10600, 5MT10868
Arrington, R. 1990	90023. Hindmarsh Stock Pond	Small Block	5MT10834
Arrington, R. 1991 (Arrington, R. 1991b)	91009. Mesa Verde Waterline	Large Linear Pipeline	5MT10594-10596, 5MT10598
Flint, P. 1991a	91a. Mesa Verde Waterline	Large Linear Access	5MT11580-11589, 5MT11660-11667
Flint, P. 1991b	91b. Mesa Verde Waterline	Large Linear Pipeline	5MT11451-11453
Honeycutt, L. and J. Fetterman, 1991	9108. Empire Electric	Large Linear	5MT10801-10819
Fuller, S. 1994	9419. Mountain Gravel Pit	Large Block	5MT12048
Hand, O. 1994	94. Colorado Dept. Of Transportation	Large Linear	5MT12080-12081
McCorgy 1994	94. Colorado Dept. Of Transportation	Large Linear	0
Total Surveys = 22			Total Sites = 118

9.76 ha (24.1 a). The pipeline right-of-way crossed several sections of BLM-managed lands, a total of 5 km (3.1 mi), total acreage surveyed was 30.5 ha (75.3 a). A small section of the pipeline crossed through State of Colorado managed lands, a total of .32 km (.5 mi). The total area surveyed on state land was 2 ha (4.8 a). The pipeline also crossed private lands owned by Russel Hindmarsh, 2.4 km (1.2 mi), the survey covered 13.4 ha (35.2 a). Three prehistoric and two historic sites were found: 5MT11451, a Basketmaker III-Pueblo I habitation, with rubble, depression, and artifact scatter; 5MT11452, a Pueblo II habitation with rubble mound and artifact scatter; 5MT11453, the George and Perne Culp historic homestead dating from 1894-1929; 5MT11454, a Pueblo I habitation, rubble and artifact scatter; and 5MT11455, an historic axe hewn tent frame, corral, and trash scatter. (Flint 1991b).

The fourth cultural resource inventory conducted in connection with the preconstruction surveys for Phase III of the Mesa Verde Waterline Replacement Project was conducted on the West and East Access Roads and Center Loop Road (Flint 1991b). A 61 m (200 ft) wide corridor, 30 m (100 ft) on either side of the road was examined for cultural resources. A total of five prehistoric sites, two historic sites, and 11 isolated finds was recorded on the access roads. On the West Access Road 5MT11565 and 5MT11566 were Pueblo I-Pueblo II habitation sites; 5MT11569 was a rubble mound and lithics possibly dating to Pueblo I-Pueblo II; 5MT11563 was the remains of the Henry I. Hickey homestead dating from 1917-1929; and 5MT11568 was the William Veach homestead 1870s to 1934. Five isolated finds on the West Access road were: 5MT11560 consisting of two pieces of flaked lithic debitage and one scraper; 5MT11561 consisting of 10 Pueblo II ceramics; both 5MT11562 and 5MT11564 had flaked lithic debitage, and 5MT11567 had one grayware sherd. No cultural resources were recorded on the Center Loop Road. On the East Access Road two prehistoric sites and six isolated finds were discovered: 5MT11665, a Basketmaker III-Pueblo I lithic and ceramic scatter, habitation; and 5MT11667, a Pueblo II habitation consisting of a rubble mound, kiva depression and midden. Isolated finds on the East Access Road were: 5MT11660 one Mancos Black-on-white sherd; 5MT11661 one corrugated sherd; 5MT11662 a whiteware sherd; 5MT11663 one corrugated sherd; 5MT11664 a grayware sherd; and 5MT11666, one grayware sherd and two pieces of flaked lithic debitage.

Mesa Verde Waterline Replacement Project Phase III Intensive Inventory in the Montezuma Valley Segment

When construction activities along the Montezuma Valley Segment began in March 1992, all sites reported in the preconstruction surveys (Arrington 1991b, Flint 1991a, Flint 1991b) were protected by snow fencing, avoidance, padding, and were monitored prior to and during construction. Mesa Verde archeologists also monitored the construction activities, through all phases of construction during which time they discovered and documented 20 additional cultural resources. Many sites were discovered during blading operations on the right-of-way, others were discovered in surveys of temporary use areas.

Along the West Access Road, one prehistoric site, 5MT11668 (a Basketmaker III, possible habitation, lithic and ceramic scatter and charcoal concentration) was discovered through blading the West Access Road. The site was tested because it was impacted by the access road construction (Dominguez 1995).

Along the East Access road, six sites were found when the road was rerouted to avoid a difficult corner and a site which had been discovered on the preconstruction survey, 5MT11667 (a Pueblo II, habitation, rubble mound, kiva depression and midden). Site 5MT11667 was tested (Dominguez 1991) and was scheduled to be padded prior to construction, but access through the site was so strictly confined that large pipe trucks and heavy equipment could not stay within the restricted limits. Therefore, a new route was chosen to the north of the site, to protect and avoid the site and to allow the proper width for heavy equipment. The land owner was in agreement with the decision. Unfortunately, during the blading operations for the alternate route one prehistoric site, three limited activity areas, and two isolated finds were discovered. Site 5MT11706 (a Pueblo II, habitation consisting of two parallel coursed masonry walls) was found in the rerouted access road. This site was padded during the entire construction project and was then tested. The three limited activity sites which were found were 5MT11708, a Pueblo II nonhuman bone and ceramic scatter;

5MT11709, a possible Anasazi ash stain; and 5MT11710 a buried hearth, possibly prehistoric. Two isolated finds 5MT11707 (a Basketmaker III grayware sherd), and 5MT11724 (an end scraper) were also recorded on the rerouting of the East Access Road.

Along the main pipeline easement four sites were discovered during construction activities. Site 5MT11728 a possible Basketmaker III or Pueblo II jacal structure was found during trenching activities. Site 5MT11729, a burned pit feature had been bisected by the 1951 pipeline construction. Both sites 5MT11728 and 5MT11729 were excavated by Mesa Verde Waterline staff during the project. Isolated finds 5MT11725, a piece of flaked lithic debitage and 5MT11726, a Pueblo II, Mancos Black-on-white sherd, were recorded along the main pipeline easement.

In a survey of 18.6 ha (46.04 a) of Temporary Use Areas for the construction phase of the Mesa Verde Waterline Replacement Project, nine sites were found. The survey areas, which had not been investigated during the preconstruction, were located on BLM, NPS, State of Colorado, and private lands, all within the right-of-way and just outside of the surveyed buffer zones for archeological clearance (Table 5.4). The temporary use areas were additional lands surrounding the installation of the major culverts, leadout ditches, stockpiles and brush areas, turn around areas for heavy equipment, and an existing quarter mile access road to be possibly upgraded. These areas were identified in the field by station number and flagged off by the Projects Inspector and the contractor's field foreman. In May and June of 1992, cultural resource inventories and threatened and endangered species surveys were conducted by the Division of Research and Resource Management staff. Continuation work was conducted by Katherine Bulinski, BLM Realty Specialist.

During the Temporary Use Area survey three prehistoric sites and six isolated finds were found where the installations of the culverts were expanded. In all cases the resources were flagged, avoided and monitored during all phases of construction (Ives and Colyer 1992). Site 5MT11711 was a Basketmaker III habitation, lithic, ceramic and rubble scatter; 5MT11712 was a Basketmaker III-Early Pueblo II habitation, lithic, ceramic, and rubble concentration; and 5MT11727 was a Pueblo II-Pueblo III habitation, rubble mound, two kivas, and a midden. Isolated finds included 5MT11713 (Basketmaker III Chapin Black-on-white sherd), 5MT11714 (Basketmaker III, two Early Pueblo grayware sherds), 5MT11715 (one Basketmaker III grayware sherd), 5MT11716 (four Basketmaker III grayware sherds), 5MT11717 (Black-on-white sherd), and 5MT11718 (Pueblo II, seven Mancos Black-on-white sherds).

Description of Archeological Sites Recorded in the Montezuma Valley Segment During Construction of the Mesa Verde Waterline Replacement Project Phase III

Ten archeological sites (5MT11668, 5MT11706, 5MT11708, 5MT11709, 5MT11710, 5MT11711, 5MT11712, 5MT11727, 5MT117728, and 5MT11729) and 10 isolated finds (5MT11707, 5MT11713, 5MT11714, 5MT11715, 5MT11716, 5MT11717, 5MT11718, 5MT11724, 5MT11725, and 5MT11726) were found in the Montezuma Valley Segment during survey and monitoring for Phase III of the Mesa Verde Waterline Replacement Project (Table 5.5).

5MT11668, Basketmaker III Habitation

Site 5MT11668 consisted of a Basketmaker III small habitation, lithic and ceramic scatter, located on a broad flat trending northwest-southeast slope (Figure 5.7). A charcoal stain and artifacts were exposed during blading operations on the West Access Road. The charcoal stain was 6 m long with Chapin Gray sherds and flaked lithic debitage found along the ditch line on the north side of the access road. To the north of the access road was a light scatter of Early Pueblo Gray and Chapin Gray ceramics and flaked lithic debitage. The site dimensions were 20 m north-south by 30 m east-west. One 50-x-50 cm test unit was placed in the charcoal stain. The results suggested that the stain was burned structural fill possibly indicating that a burned pit house or large feature extended under the West Access Road (Dominguez 1992).

Site 5MT11668 is considered to be eligible for the National Register because it contains intact subsurface deposits and has the potential to yield information on the early Basketmaker people who inhabited the Montezuma Valley. It was tested during the construction phase (Domiguez 1992).

Table 5.4. Temporary Use Areas Surveyed during Construction of the Mesa Verde Waterline Replacement Project Phase III

Temporary Use Area	Hectares (Acres) Surveyed	Sites Found
Turn Around Station 40+68	0.008 (0.02)	0
Turn Around Station 67+50	0.02 (0.06)	0
Turn Around Station 73+50	0.008 (0.02)	0
Turn Around Station 191+50	0.19 (0.46)	0
Turn Around Station 56+00	0.13 (0.34)	0
Turn Around Station 62+00 to 72+00	0.7 (1.72)	0
Culvert #1	1.13 (1.8)	0
Culvert #2	1.13 (2.8)	0
East Access Road Intersection Station 90+00	0.2 (0.5)	0
Culvert #3	0.57 (1.4)	0
Culvert #4	0.57 (1.4)	0
Culvert #5	1.13 (2.8)	0
Turn Around Station 119+50	0.37 (0.92)	0
Culvert #6	0.74 (1.83)	0
Culvert #7	1.13 (2.8)	5MT11718
Culvert #8	1.9 (4.6)	5MT11717
Culvert #9	0.74 (1.83)	5MT11712, 5MT11716
Culvert #10, Culvert #11	1.17 (2.9)	5MT11711 5MT11715
Culvert #12	0.57 (1.4)	5MT11713
Culvert #13	1 (2.6)	5MT11727
Cortez Loop Road Intersection Station 251+00	0.28 (.7)	0
Culvert #14	1.2 (2.9)	0
Culvert #15	0.37 (0.92)	0
West Access Road Intersection Station 278+00	0.2 (0.5)	0
Culvert #18	0.1 (0.3)	0
West Access Road Intersection Station 278+00	0.1 (0.3)	0
Culvert #16	0.1 (0.3)	0
Access Road (T.36N, R.14W, Sections 31 and 32)	2.5 (6.06)	0
Lead Out Ditch #1	0.08 (0.2)	0
Lead Out Ditch #2	0.1 (0.23)	0
Lead Out Ditch #3	0.9 (0.21)	0
Lead Out Ditch #4	0.08 (0.2)	0
Lead Out Ditch #5	0.03 (0.07)	0
Lead Out Ditch #6	0.03 (0.07)	0
Lead Out Ditch #7	0.01 (0.03)	0
Cortez Loop Road Top of Hill	0.03 (0.07)	0
Stock Pile and Brush Area Station 51+00	0.02 (0.05)	0
Stock Pile and Brush Area Station 69+00	0.01 (0.02)	0
Stock Pile and Brush Area Station 76+00	0.01 (0.03)	0
Stock Pile and Brush Area Station 82+00	0.01 (0.02)	0
Stock Pile and Brush Area Station 97+10	0.01 (0.02)	0
Stock Pile and Brush Area Station 115+00	0.01 (0.02)	0
Stock Pile and Brush Area Station 134+00	0.01 (0.02)	0
Stock Pile and Brush Area Station 151+50	0.01 (0.02)	0

Note: Station numbers and numbered culverts were found on the construction drawings. The access roads did not have station numbers and were not present on the construction drawings, therefore all temporary use areas were located by mileage from the existing pipeline.

Table 5.5 Sites Located During Construction Surveys and Monitoring in the Montezuma Valley Segment

Site Number	Elevation m (ft)	Cultural Affiliation	Site Type	Site Function
5MT11668	1931 (6335)	Basketmaker III	Lithic and Ceramic Scatter	Habitation
5MT11706	1994 (6540)	Pueblo II	Masonry Walls	Habitation
5MT11707	1997 (6550)	Basketmaker III	Isolated Find	1 Grayware
5MT11708	1994 (6540)	Pueblo II	Nonhuman Bone and Ceramic Scatter	Limited Activity Area
5MT11709	1997 (6550)	Protohistoric/ Prehistoric, A.D. 1730-1850	Ash Stain	Limited Activity Area
5MT11710	2005 (6575)	Indeterminate	Hearth	Limited Activity Area
5MT11711	2018 (6220)	Basketmaker III	Lithic, Ceramic and Rubble Scatter	Habitation
5MT11712	2018 (6620)	Basketmaker III-Pueblo II	Lithic, Ceramic and Rubble Concentration	Habitation
5MT11713	2018 (6620)	Basketmaker III	Isolated Find	1 Chapin Black-on-white Sherd
5MT11714	2018 (6220)	Basketmaker III	Isolated Find	2 Early Pueblo Gray Sherds
5MT11715	2012 (6600)	Basketmaker III	Isolated Find	1 Plain Grayware
5MT11716	2012 (6600)	Basketmaker III	Isolated Find	4 Plain Grayware
5MT11717	2018 (6620)	Anasazi	Isolated Find	1 Black-on-white sherd
5MT11718	2037 (6680)	Pueblo II	Isolated Find	7 Mancos Black-on-white Sherds
5MT11724	2021 (6630)	Prehistoric	Isolated Find	1 End Scraper
5MT11725	2034 (6670)	Prehistoric	Isolated Find	1 Utilized Flake
5MT11726	2021 (6630)	Pueblo II	Isolated Find	1 Mancos Black-on-white Sherd
5MT11727	2021 (6600)	Basketmaker III or Pueblo II	Jacal Structure	Possible Habitation or Storage
5MT11729	2088 (6850)	Prehistoric	Burned Pit Feature	Limited Activity
Total Sites = 20				

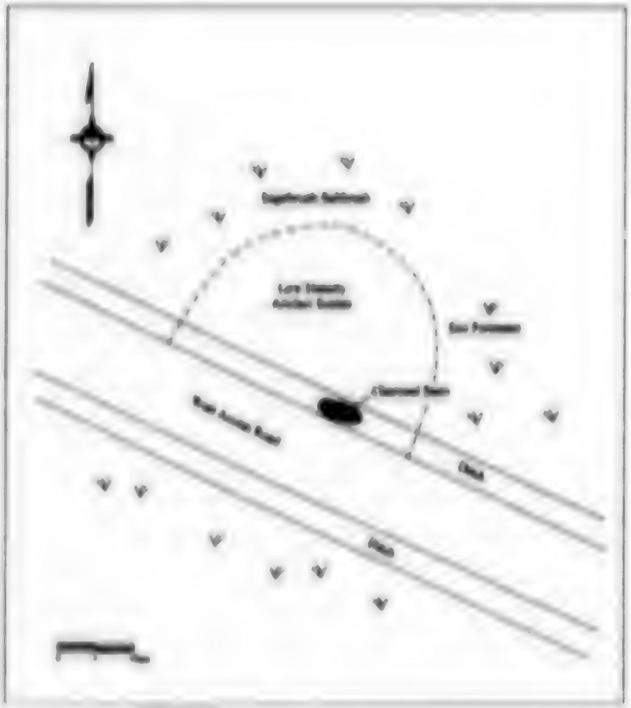


Figure 5.7. 5MT11668 site plan map.

5MT11706, Pueblo II Masonry Walls

Site 5MT11706 was discovered during blading operations on the East Access Road. Basal foundations of a Pueblo II possible habitation site were revealed with two parallel sandstone masonry walls with two courses which were oriented northwest-southeast 9 m in length by 2.15 m in width. To the northeast of the wall lines, located on undisturbed lands were the remains of two Chapin Gray sherds and two one-hand manos. No other stains or depressions were visible in the access road or surrounding area. Because the Pueblo II structure was likely to yield information on settlement patterns and prehistoric construction it was considered eligible for the National Register and was excavated as part of the mitigation program for the Mesa Verde Waterline Replacement Project and is reported in Chapter 7 of this document on Montezuma Valley Segment Testing and Excavation.

5MT11708, Pueblo II Ceramic and Faunal Scatter

Site 5MT11708 consisted of large mammal bone fragments and Pueblo II corrugated ceramics located in an area of 2.5 m north-south by 4 m east-west (Figure 5.8). The site was located on the east slope of a northwest-southeast trending low ridge on the northeast side of the East Access Road. The area was chained in the 1960s. No other features or stains were noted on the surface. The site was not threatened during construction and was protected with snow fencing materials during all phases of construction. Testing would be necessary at 5MT11708 to determine National Register eligibility and to determine whether intact subsurface deposits remain. The site may be related to 5MT11667 (a Pueblo II habitation site) located to the south.

5MT11709, Ash Stain

Site 5MT11709 consisted of an ash stain located on the north side of an east-west trending ridge. The feature was discovered during blading operations along the southern edge of the East Access Road. The ash stain was 50 cm east-west by 25 cm north-south and contained charcoal chunks and burned mammal bone fragments. A Chapin Gray sherd was recovered from

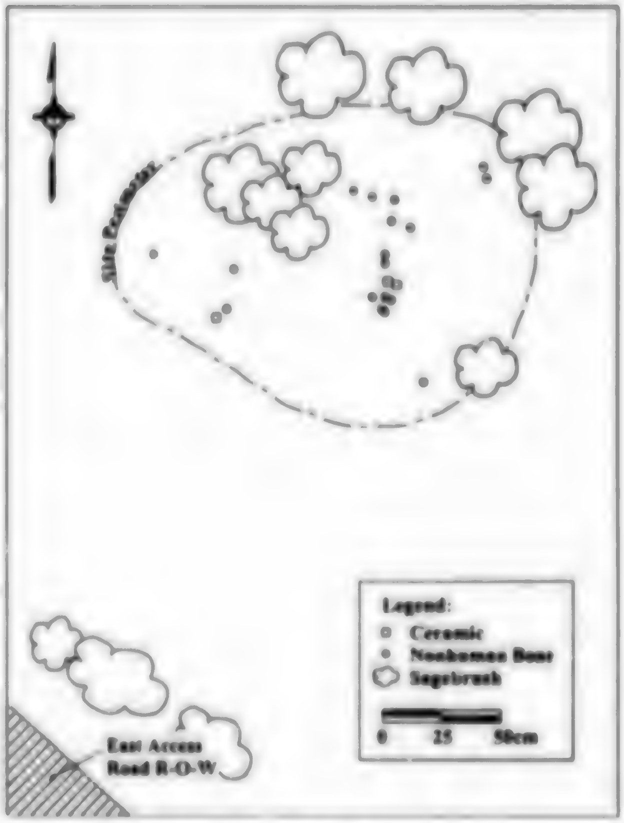


Figure 5.8. 5MT11708 site plan map.

the soil approximately 3 cm above the ash feature. Site 5MT11709 was threatened during construction and was excavated as part of the mitigation work (Dominguez 1992). A radiocarbon date obtained from a hearth at the site was 160 + 60 BP (Beta 75291) A.D. 1790 (1730-1850) suggesting a protohistoric or historic use. No artifacts were associated with the hearth.

5MT11710, Hearth

Site 5MT11710 was a hearth consisting of burned sandstone associated with ash and a charcoal flecked stain. The feature was found on the southern edge of the East Access Road during blading operations. The feature was approximately 10 cm in diameter and was surrounded by highly oxidized sandstone covering an area approximately 20 cm in diameter. The total area of the feature was 35 cm north-south by 50 cm east-west. The feature was located several meters from 5MT11708 and was tested to determine its significance for the National Register (Dominguez 1992).

5MT11711, Basketmaker III Habitation

Site 5MT11711 consisted of a Basketmaker III habitation indicated by a lithics, ceramics, and four sandstone rubble features. The site was located on a northwest-southeast trending ridge. Cultural materials were washing downslope into the eastern edge of a deeply cut arroyo of an unnamed intermittent drainage. Sparse quantities of oxidized and unoxidized block and tabular sandstone fragments were observed on the surface. The site was 75 m northwest-southeast by 38 m northeast-southwest (Figure 5.9)

Feature 1 consisted of a rubble concentration 2 m northwest-southeast by 1 m northeast-southwest. The sandstone consisted of highly oxidized block and tabular fragments. Sandstone fragments ranged in size from 26-12 cm in length and 8-13 cm in width.

Feature 2 consisted of a rubble concentration 2 m east-west by 1 m north-south. The sandstone rubble was of unshaped tabular fragments. The average length and width ranged from 7-10 cm.

Feature 3 was a small rubble scatter approximately 1 m in diameter. Sandstone fragments were generally block and tabular, with an average length and width ranging from 4-10 cm.

Feature 4 consisted of a rubble concentration approximately 1 m in diameter. The sandstone was unoxidized unshaped block fragments ranging in length from 7-20 cm and varying in width from 4-15 cm.

Features 1 through 3 probably represented small remnants of living structures. The pithouse may have been southeast and upslope from these features but there were no surface indications. It is probable that the site retains the integrity of subsurface artifacts and architectural remains as well. Dense concentrations of cultural materials were observed on the site's surface around the rubble concentrations and were lightly scattered downslope along the ridgetop, although no stains or depressions were observed. Ceramics observed on the surface indicated a Basketmaker III occupation with diagnostic Chapin Black-on-white and Early Pueblo Gray ceramics. The lithic debitage observed included the material types of Morrison chert and quartzites, silicified siltstone, and Brushy Basin chert. Only one Morrison quartzite tool, an endscraper, was observed.

Site 5MT11711 is likely to yield significant data pertinent to the prehistoric occupation of the north escarpment of Mesa Verde and is eligible for the National Register. The site was avoided and protected during the construction of the waterline.

5MT11712, Basketmaker III-Pueblo II Habitation

Site 5MT11712 consisted of lithics, ceramics, and seven rubble concentration features located on a northwest-southeast trending ridge slope. The surface was covered with a dense sagebrush community with small drainages severely eroding the surface. The site was a possible multicomponent Basketmaker III to Early Pueblo II habitation 62 m northwest-southeast by 45 m northeast-southwest (Figure 5.10). The features may represent structural remains with possible subsurface integrity although neither the pithouse or kiva was visible on the surface.

Feature 1 consisted of a small concentration of rubble approximately 1 m in diameter. The rubble consisted of oxidized, unshaped, thin, tabular sandstone fragments. Thickness of the sandstone slabs ranged from .5 to 1 cm. The fragments ranged in length from 3 to 8 cm, and in width from 4 to 7 cm.

Feature 2 consisted of a large concentration of rubble 7m northwest-southeast by 5m northeast-southwest.

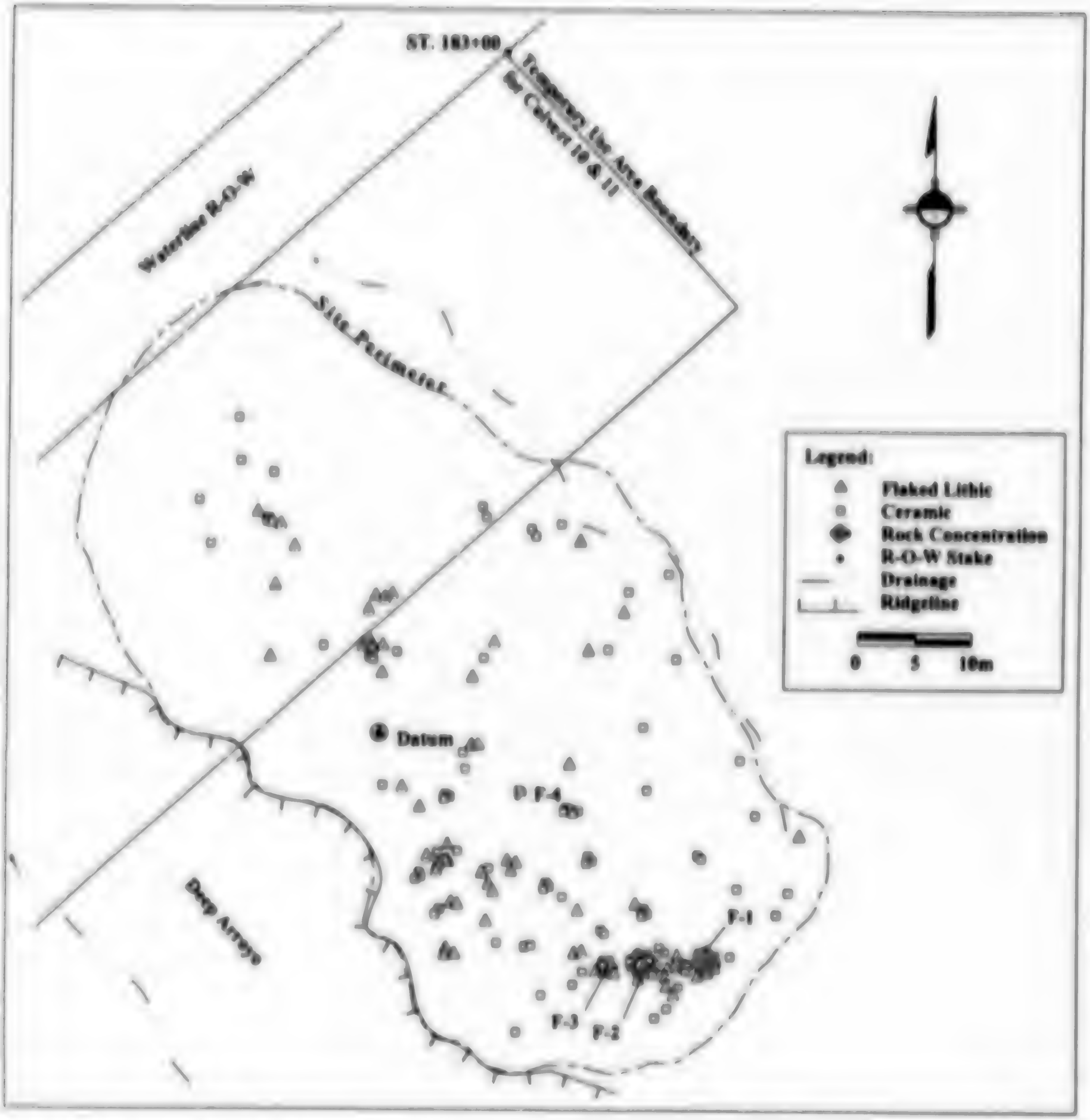


Figure 5.9. SMT11711 site plan map.

A fairly dense concentration of flaked lithic debitage and ceramics was located within the area of the feature. The rubble consisted of oxidized and unoxidized block and tabular unshaped sandstone fragments. The average length of the blocks was 25 cm and the widths were approximately 20 cm. The smaller oxidized pieces ranged in length from 5 to 8 cm.

Feature 3 consisted of a rubble concentration of widely dispersed sandstone fragments covering an area 5 m north-south by 4 m east-west. The rubble was oxidized thin unshaped sandstone fragments. The average length of these fragments was 8 cm and the width 5 cm.

Feature 4 consisted of a rubble concentration 2 m north-south by 1 m east-west. The rubble fragments were small, unshaped tabular oxidized sandstone fragments. The average length was 9 cm and the width was 5 cm.

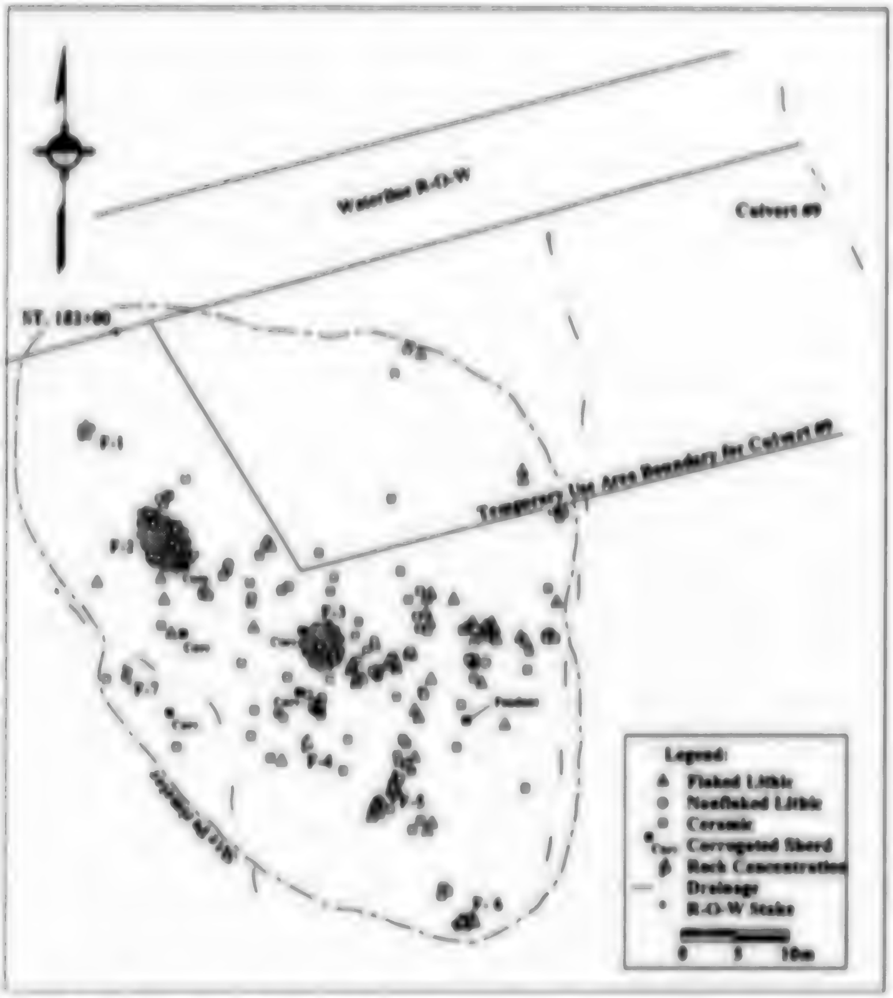


Figure 5.10. 5MT11712 site plan map.

Feature 5 consisted of a rubble concentration 3 m north-south by 2 m east-west. The rubble was a mixture of unshaped, thin block, and tabular sandstone fragments and small oxidized chunks. The average length was approximately 6 cm and the width was 4 cm. Flaked lithic debitage, river cobble with cortex, and a chopper were observed within the confines of this feature.

Feature 6 consisted of a small, 1m diameter, rubble concentration. The thin tabular sandstone was oxidized with numerous smaller fragments present. Average length of the tabular sandstone was 10 cm and the width ranged from 4 to 8 cm.

Feature 7 consisted of an oxidized rubble concentration with one possible upright slab. The rubble was tabular unshaped sandstone ranging in length from 15 to 20 cm and the average thickness was 5 cm.

These features may represent possible remnants of structures with a high potential for intact subsurface deposits of cultural remains. No depressions or stains were observed on the surface. The ceramic assemblage at the site contained an abundance of Early Pueblo Gray body sherds, Chapin Gray, and Chapin Black-on-white representing a possible Basketmaker III component. Small quantities of Pueblo I ceramics including Piedra Black-on-white and Moccasin Gray were observed. Early Pueblo II ceramics included Mancos Corrugated and corrugated body sherds. Flaked lithic debitage material types included silicified siltstone, Morrison chert and quartzites, and Burro Canyon quartzite. Lithic tools included a utilized flake, hammerstone, and chopper. One pendant fragment of ground and polished siltstone was observed on the site.

Site 5MT11712 is considered eligible for the National Register and may yield information on prehistoric settlement patterns of the Basketmaker III-Pueblo II populations along the base of the north escarpment of Mesa Verde. The site contains intact subsurface deposits of cultural material to address many research questions. It was avoided during construction.

5MT11727, Pueblo II Habitation

Site 5MT11727 consisted of a large rubble mound, two kiva depressions, a midden and associated scatter of cultural materials located on a northwest-southeast trending ridge (Figure 5.11). The habitation site was a large Early Pueblo II-Early Pueblo III structure located northeast of a steep sided, unnamed intermittent drainage. The site dimensions were 82 m northwest-southeast by 44 m northeast-southwest. The rubble mound was 25 m northeast-southwest by 10 m northwest-southeast. The mound was "C" shaped with a possible double row of rooms, estimated by the width, with a kiva depression (Kiva A) measuring 6 m in diameter. Wall fall was evident and prevalent on the surface. The building material consisted of both shaped and unshaped, pecked and spalled, block and tabular sandstone. There were some sandstone slabs that were oxidized although the majority of the slabs were not burned. The size of the sandstone averaged 10 to 25 cm with the largest measuring 40 cm in length. To the northeast of the "C" shaped mound was a "wing," another roomblock appendage (double row of rooms estimated by width), 10 m northeast-southwest by 8 m northwest-southeast. Kiva B was a large depression 8 m in diameter abutting the wing's appendage interior wall fall. The building material in the wing area consisted of similar material shape and size as the "C" shaped rubble mound, with the exception that the large 40 to 50 cm sandstone blocks were not present. The majority of the sandstone was unoxidized but there were a few oxidized rocks.

The midden area was located south of the rubble mound and upslope along the ridge crest. Cultural materials in the area included a fairly dense distribution of lithics and ceramics. The midden encompassed an area ap-

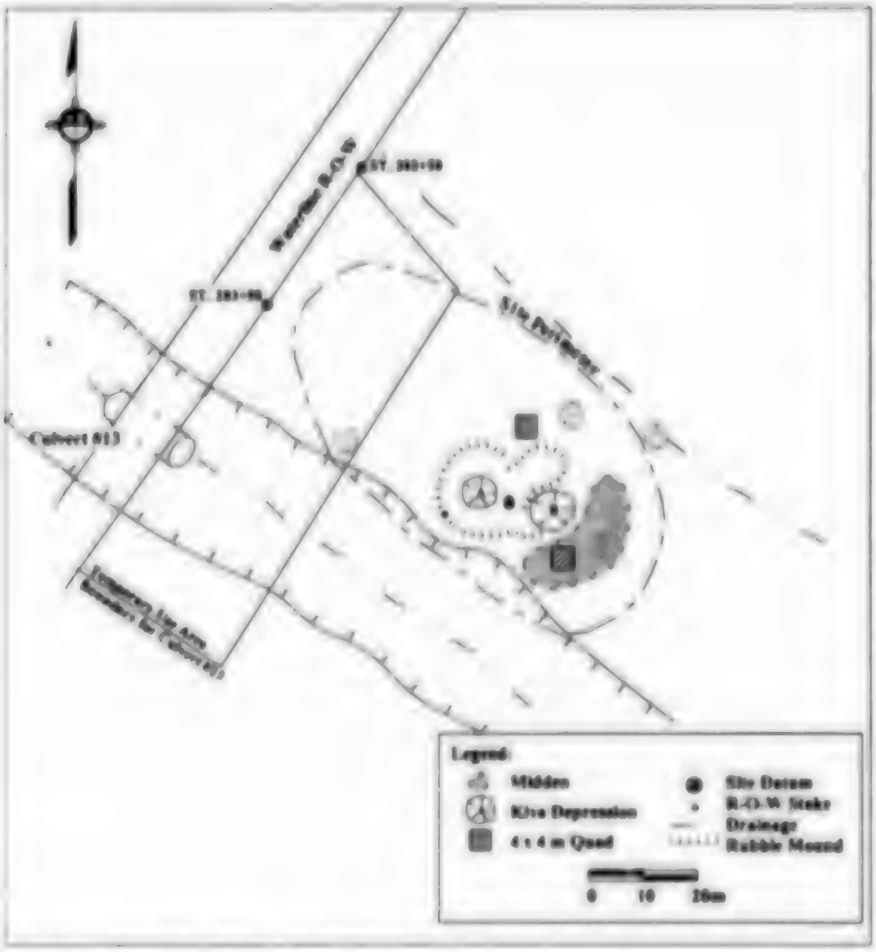


Figure 5.11. 5MT11727 site plan map.

proximately 25 m northeast-southwest by 10 m northwest-southeast. The ceramic assemblage recorded in two 4-x-4 m sample quadrats included Mancos Black-on-white and McElmo Black-on-white. Lithic materials identified included Brushy Basin chert, silicified siltstone, Morrison chert and quartzite, Washington Pass chert, and andesite/diorite river cobbles. One core/hammerstone tool was observed. A large quantity of flaked lithic debitage was noted. Groundstone generally was sparse with only a fragment of a tabular slab observed. Other materials observed on the surface included: four bone beads, one mano fragment, one two-hand mano fragment, core/hammerstone, Mesa Verde Corrugated Rim sherds, one Mancos Corrugated sherd, and three Mancos Black-on-white Corrugated sherds.

Based on the distribution of the surface ceramic assemblage, the "C" shaped rubble mound and associated Kiva A represent a Pueblo II to early Pueblo III habitation site. McElmo Black-on-white and Mesa Verde Corrugated sherds observed on the surface in the western portion of the site were eroding from the rubble mound. The "wing" of the rubble mound associated with Kiva B probably dates from the early Pueblo II period based on the ceramic assemblage located to the north and northeast of the roomblock.

Site 5MT11727 is considered eligible for the National Register because it contains intact deposits of cultural materials and structural remains which will yield information on intrasite patterning of Early Pueblo II and Early Pueblo III occupation of the north escarpment area of Mesa Verde. The site was avoided during construction.

5MT11728, Jacal Structure

Site 5MT11728 consisted of a of a subsurface feature morphologically similar to a one room jacal structure. The feature was exposed in profile during trenching. It was located on a low northwest-southeast trending ridge and east of an unnamed intermittent drainage. The feature was located on the north side of the waterline trench approximately 10-20 cm below surface and was 1.18 m in length. The site was bisected transversely on an east-west axis near the south end of the feature. It was a shallow basin-shaped pit with apparent wall melt that was oxidized. There was some post-abandonment wash along the sidewalls and floor of the feature. Overlying the wash stratum was a stratum of burned soils (structural collapse). Contained within the burned stratum were fragments of sandstone, charcoal, and large burned pole fragments with pockets of ash and burned adobe or daub. At the base of the feature 4 cm long fragments of unshaped sandstone were partially exposed in the profile. No cultural materials were observed in the profile or on the surrounding ground surface. Site 5MT11728 is a possible Basketmaker III or Pueblo II structure and was excavated as part of the mitigation program and is reported in Chapter 7: Montezuma Valley Segment Testing and Excavation. With one nearly intact subsurface feature the site was eligible for National Register nomination.

Site 5MT11729, Basin-shaped Pit

Site 5MT11729 was a shallow basin-shaped pit found during blading operations on the main pipeline right-of-way, south of site 5MT10595. The feature consisted of a large 2 m northeast-southwest by 1.4 m northwest-southeast oval stain with fragments of oxidized sandstone on the surface. The pit fill consisted of a dark, gray-brown clay/silt with numerous charcoal flecks and fragments of burned sandstone. Although the feature was impacted by the 1951 waterline trench and pipe, it appeared as though the feature was a sandstone slab-lined shallow basin-shaped pit. Site 5MT11729 was tested and the results are reported in Chapter 7: Montezuma Valley Segment Testing and Excavation.

Isolated Finds

The following 10 isolated finds discovered during the Mesa Verde Waterline Replacement Project Phase III in the Montezuma Valley Segment are not considered eligible for the National Register because their information is limited: 5MT11707, 5MT11713, 5MT11714, 5MT11715, 5MT11716, 5MT11717, 5MT11718, 5MT11724, 5MT11725, 5MT11726.

5MT11707, Grayware Sherd

Site 5MT11707 was an isolated find of one plain grayware sherd found east of site 5MT11706 during blading operations on the East Access Road. The artifact was located on the eastern slope of a low northwest-southeast trending ridge.

5MT11713, Chapin Black-on-white Bowl Sherd

Site 5MT11713 was an isolated find of a Basketmaker III Chapin Black-on-white bowl sherd found on a northwest-southeast trending ridge slope. The artifact was located in the southwest corner of the temporary use area delineated by construction activities around Culvert #12.

5MT11714, Early Pueblo Gray Bowl Sherds

Site 5MT11714 consisted of two Basketmaker III Early Pueblo Gray bowl sherds found 35 m northeast of 5MT11713(IF) which is downslope along a northwest-southeast trending ridge. The artifacts were located in temporary use area for construction around Culvert #12.

5MT11715, Early Pueblo Gray Bowl Sherd

Site 5MT11715 was an isolated find of a Basketmaker III Early Pueblo Gray bowl sherd located north of an unnamed intermittent drainage on a northwest-southeast trending ridge. The artifact was located in a temporary use area for construction around Culvert #10 and #11.

5MT11716, Early Pueblo Gray Bowl Sherds

Site 5MT11716 was an isolated find which consisted of four Basketmaker III Early Pueblo Gray bowl sherds. The artifacts were sparsely scattered downslope on a northwest-southeast trending ridge slope. The sherds were found in temporary use area for construction of Culvert #9.

5MT11717, Black-on-white Bowl Sherd

Site 5MT11717 was an isolated find of a black-on-white bowl sherd. The artifact was found on the upper ridge which is northwest-southeast trending south and upslope from an unnamed intermittent drainage. The artifact was 24 m (80 ft) south of the waterline right-of-way and was located in temporary use area for construction of Culvert #8.

5MT11718, Mancos Black-on-white Jar Sherds

Site 5MT11718 was an isolated find which was a Pueblo II "pot break," containing seven Mancos Black-on-white jar sherds. The small cluster of sherds was found on a ridge slope that is northwest-southeast trending. The site was located in temporary use area for construction of Culvert #7.

5MT11724, Chert End Scraper

Site 5MT11724 was an isolated find of one Brushy Basin chert end scraper located on the south bank of an intermittent drainage. It was found during blading operations of the East Access Road.

5MT11725, Basalt Utilized Flake

Site 5MT11725 was an isolated find of one basalt primary flake that was used as a tool. The artifact was found during blading operations of the main pipeline right-of-way, along a southern bank of a steep arroyo.

5MT11726, Mancos Black-on-white Sherd

Site 5MT11726 was an isolated find of one Pueblo II Mancos Black-on-white sherd found during blading operations along the main pipeline right-of-way.

Settlement Patterns and Land Use in the Montezuma Valley Segment

To understand the settlement patterns and land use over time in the Montezuma Valley Segment, all sites previously recorded and those documented as a result of the Mesa Verde Waterline Replacement Project were included in a locational analysis. Multiple occupations occurred quite frequently and therefore one site location could be representative of several time periods of prehistory. A total of three sites and one isolated find were assigned to the Archaic period. Only one isolated projectile point from the Basketmaker II period was located. For the Basketmaker III period 22 sites and 13 isolated finds have been found, while for the Pueblo I period 22 sites and 9 isolated finds were documented. A total of 51 sites and 11 isolated finds were assigned to the Pueblo II period. For the Pueblo III period a total of 17 sites and two isolated finds were documented. Only 17 historic sites were found within the Montezuma Segment project area. Historic trails and wagon roads within the Montezuma Valley Segment and along the escarpment of the Park indicated a wide and intricate travel pattern in the area.

Basketmaker III Period (A.D. 450 - A.D. 750)

Widely dispersed permanent habitation sites were the primary type of settlement during the Basketmaker III period in the Montezuma Valley. A total of 26 sites and 14 isolated finds were documented (Figure 5.12). From the 26 sites that were recorded, 11 sites are assigned solely to Basketmaker III period. Basketmaker III sites recorded on the Waterline Replacement Project were 5MT10834, 5MT11665, 5MT11668, 5MT11711, 5MT11712, and 5MT11728. Characteristics of these sites in general varied from artifact scatters to artifact scatters with oxidized and unoxidized sandstone scatters or concentrations. Some had rubble mounds, with or without pithouse depressions, with light artifact scatters to dense middens. One site 5MT10817 had two rubble mounds, two pithouse depressions, and an artifact scatter. Only one site 5MT10818 was documented as having sandstone slab architecture. With the exception of one site (5MT11728) that was either a possible temporary habitation and or a storage structure, the rest were all permanent habitation sites.

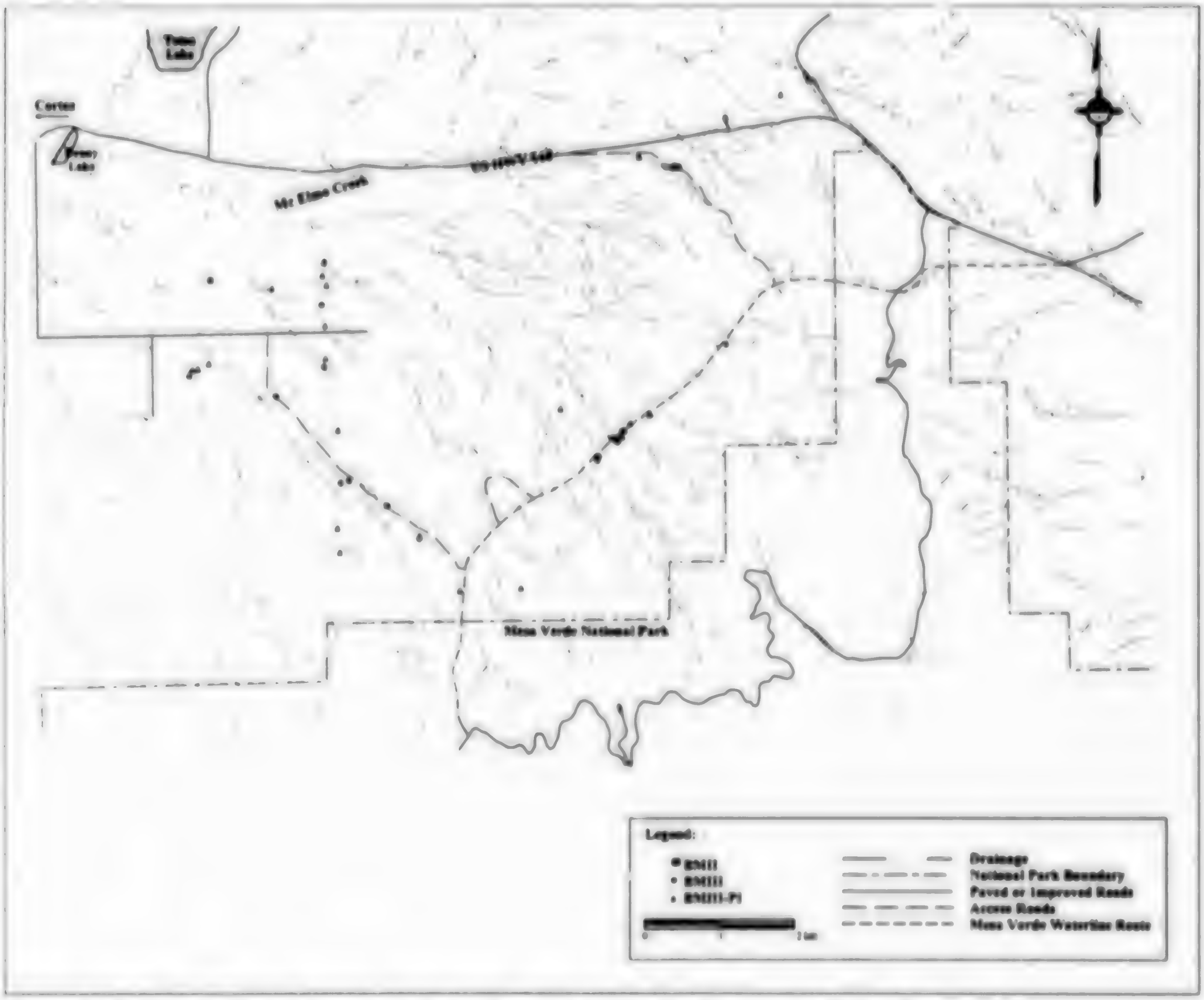


Figure 5.12. Distribution of known Basketmaker sites within the Montezuma Valley Segment.

Habitation sites were also the primary type of occupation (9 of 11 sites) during the Basketmaker III-Pueblo I period in the Montezuma Valley. Three of these habitation sites were found as part of the Mesa Verde Waterline Replacement Project: 5MT10594, 5MT10598, and 5MT11451. Other types of sites were a camp (5MT4697) and a possible kiln (5MT10868). The Basketmaker III-Pueblo I sites were characterized by artifact scatters with or without oxidized and unoxidized sandstone concentrations. The majority of the sites had rubble mounds, with or without pithouse depressions, and artifact scatters or middens. One site (5MT11712), a lithic, ceramic, and rubble scatter appeared to have continuous occupation from Basketmaker III through Pueblo II. The distribution of the Basketmaker III-Pueblo I sites in the Montezuma Valley appears to agree with previous observations (Eddy et al. 1984) in that sites representing the occupation of one or two households were widely dispersed across the landscape. There was no apparent aggregation of single households forming villages in the Montezuma Valley Segment of the project area.

Basketmaker III period habitation sites were located near intermittent drainages and arroyos. The elevation from the lowest known site, 5MT8925, at 1902 m (6240 ft) to highest known site, 5MT10594, at an elevation of 2070 m (6790 ft) was a difference of 168 m (550 ft). Of the known sites within the project area, a greater number of Basketmaker III and Basketmaker III-Pueblo I sites were found in the area of the West Access Road and sites reported on the Highline Ditch survey (Kuckleman 1986) and Empire Electric Survey (Honeycutt and Fetterman 1992). A small cluster of single household sites was found in the central area of the waterline easement. Only one habitation site was found on the lower end of the East Access Road. A total of 14 isolated finds locations consisting of ceramics was included on the site distribution map. Six were Basketmaker III, while seven were assigned to Basketmaker III-Pueblo I, and one isolated find was assigned Basketmaker III-Pueblo II.

In the Montezuma Valley Segment the surface (plan view) spacial orientation and arrangement of the Anasazi structures did not vary despite the fact that they were built on a northern facing slope. Pithouses were south of and upslope of the roomblocks and middens were south of and upslope of the pithouses. Across McElmo Creek, on southern facing slopes the architectural orientation was the same except that the pithouses were downslope of the roomblocks and middens were located downslope and downwind of the pitstructures. The pueblos in the Montezuma Valley appeared "open" to the south with the roomblock entryways facing south whether the slope was up or down. In the Montezuma Valley Segment, the ridges and drainages dip downward in a northwest direction toward McElmo Creek. The southeastern portions of the ridges rise in elevation to the base of the North Escarpment of Mesa Verde. The orientation of the surface architecture did not change with the topography but was consistent with other Anasazi sites and was a pattern which continued through time from the Basketmaker III to Pueblo III periods in the project area.

Pueblo I Period (A.D. 750 - A.D. 900)

Pueblo I sites in the Montezuma Valley Segment remained fairly evenly distributed throughout the project area (Figure 5.13). It may be that the prehistoric inhabitants were aggregating within the habitation site instead of establishing new pueblos. Most of the sites were habitation sites. The greatest number of the 20 sites and 9 isolated finds were transitional Basketmaker III-Pueblo I and Pueblo I-Pueblo II. Only two sites (5MT11454 and 5MT12062) had a single Pueblo I component. The majority of the known sites were located in the western portion of the project area and the West Access Road (5MT11569, 5MT11565, and 5MT11566). No sites of this time period were found along the East Access Road. A small cluster of sites was found along the central waterline corridor, these were 5MT11454 5MT11451, 5MT11728, and 5MT11712. As a result of the waterline project, information on three more sites of this time period was added: 5MT10594, 5MT10598 and 5MT10451.

Basketmaker III-Pueblo I site characteristics in general included burned rock and artifact scatters, lithic and ceramic scatters, but mainly the sites had a rubble mound with or without a pithouse depression, and a midden or artifact scatter. The Pueblo I sites were a rubble mound with midden and a lithic and ceramic scatter. The Pueblo I-II sites were rubble mounds, roomblocks, middens and artifact scatters.

Site architectural organization was as described for Basketmaker III. These Pueblo I habitation sites were

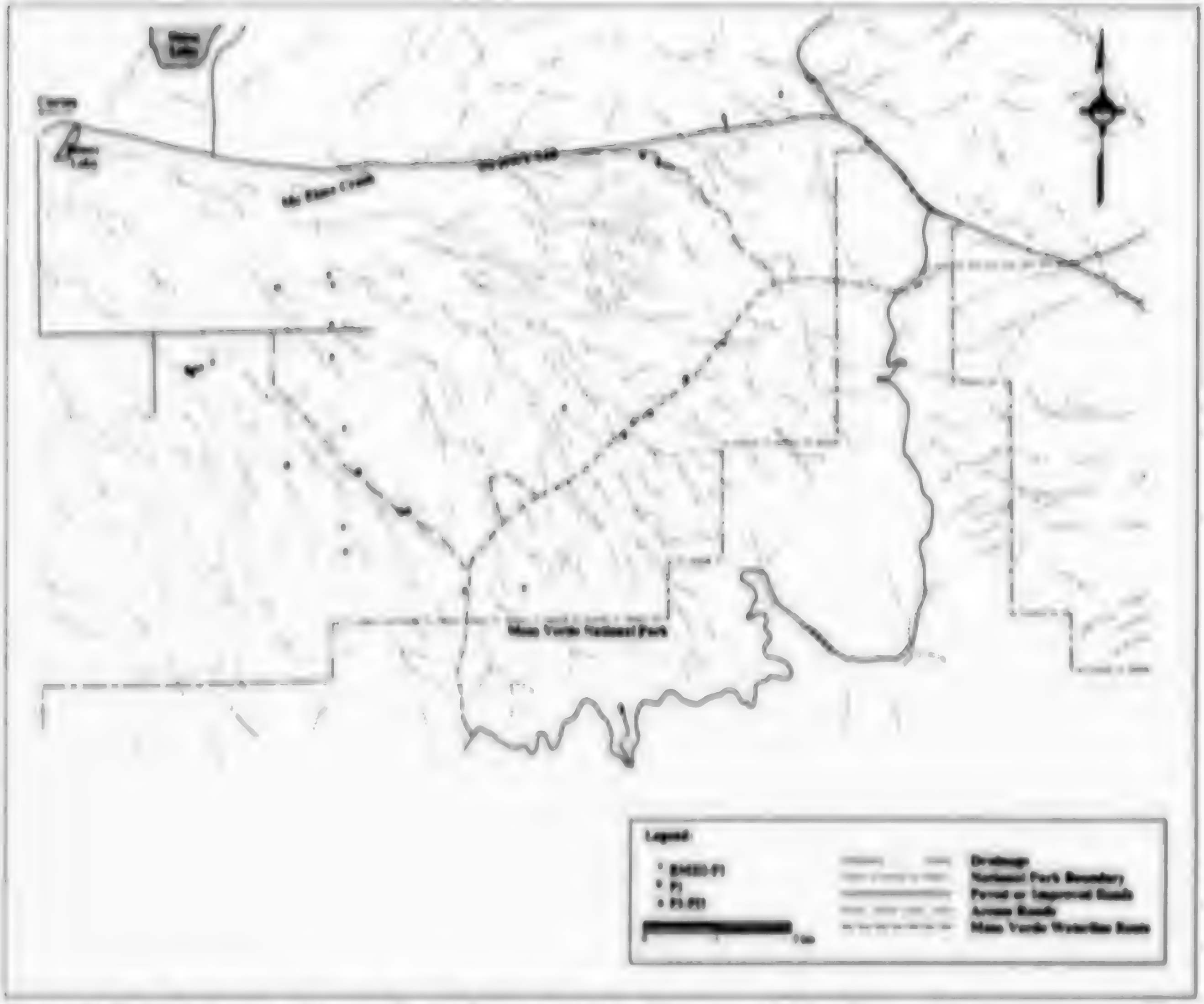


Figure 5.13. Distribution of known Pueblo I sites within the Montezuma Valley Segment.

located near or adjacent to an intermittent drainage or arroyo. Elevation differences varied from the lowest known site 5MT8925 at an elevation of 1902 m (6240 ft) to the highest known site 5MT10594 at 2070 m (6790 ft), a difference of 168 m (550 ft). During the Pueblo I period, there was a change in settlement pattern from single family hamlets into multiple family village sites, with both above-ground as well as subterranean dwellings. This trend continued into the Pueblo II period where the true kivas came into use for the first time and all non-secular domestic structures were above ground (Brisbin and Ives 1993:25).

Pueblo II Period (A.D. 900-1100)

Within the Montezuma Valley Segment of the project area a total of 51 Pueblo II sites have been documented (Figure 5.14). Characteristics of the Pueblo II habitation sites in general varied from lithic and ceramic scatters with or without rubble or vertical slab (5MT8924), scatters or concentrations (5MT11566, 5MT10597, and 5MT11712), to single rubble mounds or multiple rubble mounds. Kiva depressions were observed but some were reported as not visible from the surface. Most sites had middens and artifact scatters. Again

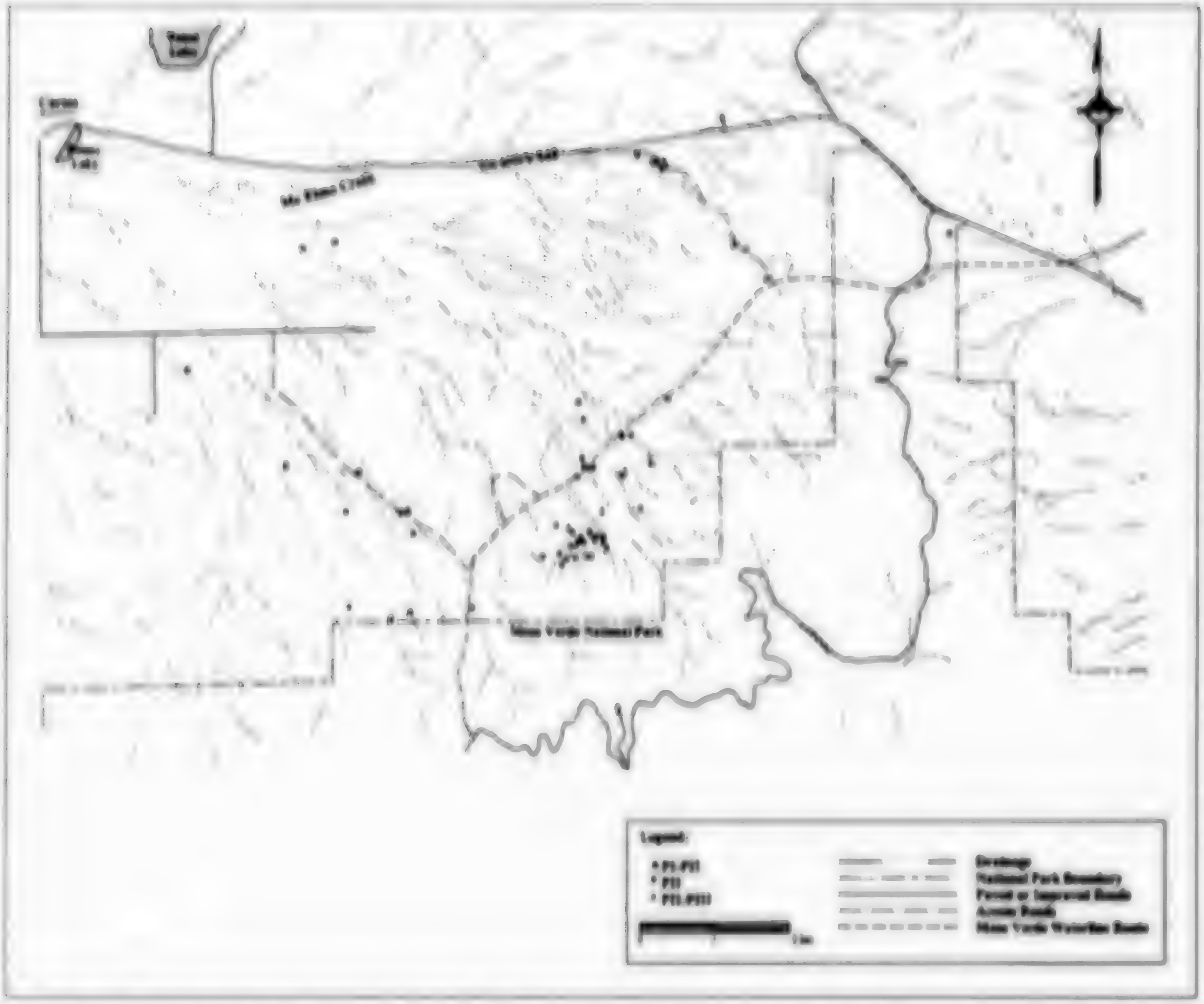


Figure 5.14. Distribution of known Pueblo II sites within the Montezuma Valley Segment.

the orientation of the site architecture to the topography was as described for Basketmaker III. The elevation of the sites varied from the lowest known site (5MT8924) at 1908 m (6260 ft) to highest known site 5MT10595 at 2100 m (6890 ft), a difference in 186 m (610 ft). Very few Pueblo II sites were recorded in the lower elevation areas of the McElmo Drainage system. The sites were still located near or adjacent to intermittent drainages and arroyos. One permanent habitation site (5MT11667), one site (5MT11706) that was abandoned during its construction, and a Pueblo II limited activity area (5MT11708) were recorded on the East Access Road. In the area of the West Access Road habitations sites were occupied from the Pueblo I period through the Pueblo II: 5MT9108, 5MT1972, 5MT11569, 5MT11565, and 5MT11566. Just south of the West Access Road a number of sites were located towards the base of the North Escarpment: 5MT10811, 5MT1961, 5MT1962, and 5MT10595. The majority of the known Pueblo II sites appeared to aggregate at the heads of the drainages towards the base of the North Escarpment. One particular 320 acre survey area, the Hindmarsh Project, contained a Pueblo II community. A great kiva depression measuring 17 m in diameter was recorded north of Hindmarsh Community at site 5MT10600. The community of Pueblo II sites actually extended onto BLM lands but the sites have not yet been recorded.

A total of 29 sites had a single Pueblo II component, four of these sites were recorded on the Waterline Project (5MT11452, 5MT11667, 5MT11706 and

5MT11708). Only one waterline site (5MT11712) was documented from Basketmaker III-Pueblo II, five sites fell in the range of Pueblo I-Pueblo II (three waterline sites 5MT11565, 5MT11566, and 5MT11569), and sixteen sites were documented as Pueblo II-Pueblo III (one of which was 5MT11727 relating to the waterline project). The majority of the sites were permanent habitations; while two sites (PII, 5MT10813 and PII-PIII, 5MT10485) were possible field houses; and two sites were considered limited activity (PII, 5MT11708 and PII-PIII, 5MT10811). One site (5MT10600) was reported as habitation/ceremonial with a large great kiva depression measuring 17 m in diameter. A total of eight ceramic and one projectile point (5MT10486) isolated finds was recorded in the project area. Isolated find 5MT8343 ranged from BMIII-PII, 5MT8345 was PI-PII, six isolated finds reported as PII, and one projectile point was assigned to PII-PIII.

Pueblo III Period (A.D. 1100-1300)

The 17 documented Pueblo III sites in the Montezuma Valley Segment were confined primarily to the base of the North Escarpment of Mesa Verde (Figure 5.15). The density of the sites declined dramatically. There were no know Pueblo III sites in the lower elevations of the Montezuma Valley Segment. Sixteen sites fell within the range of Pueblo II-Pueblo III, only one site 5MT10490 was a single component Pueblo III site. It appeared that the Montezuma Valley Segment was depopulated from A.D. 1100-1300. Only one Pueblo

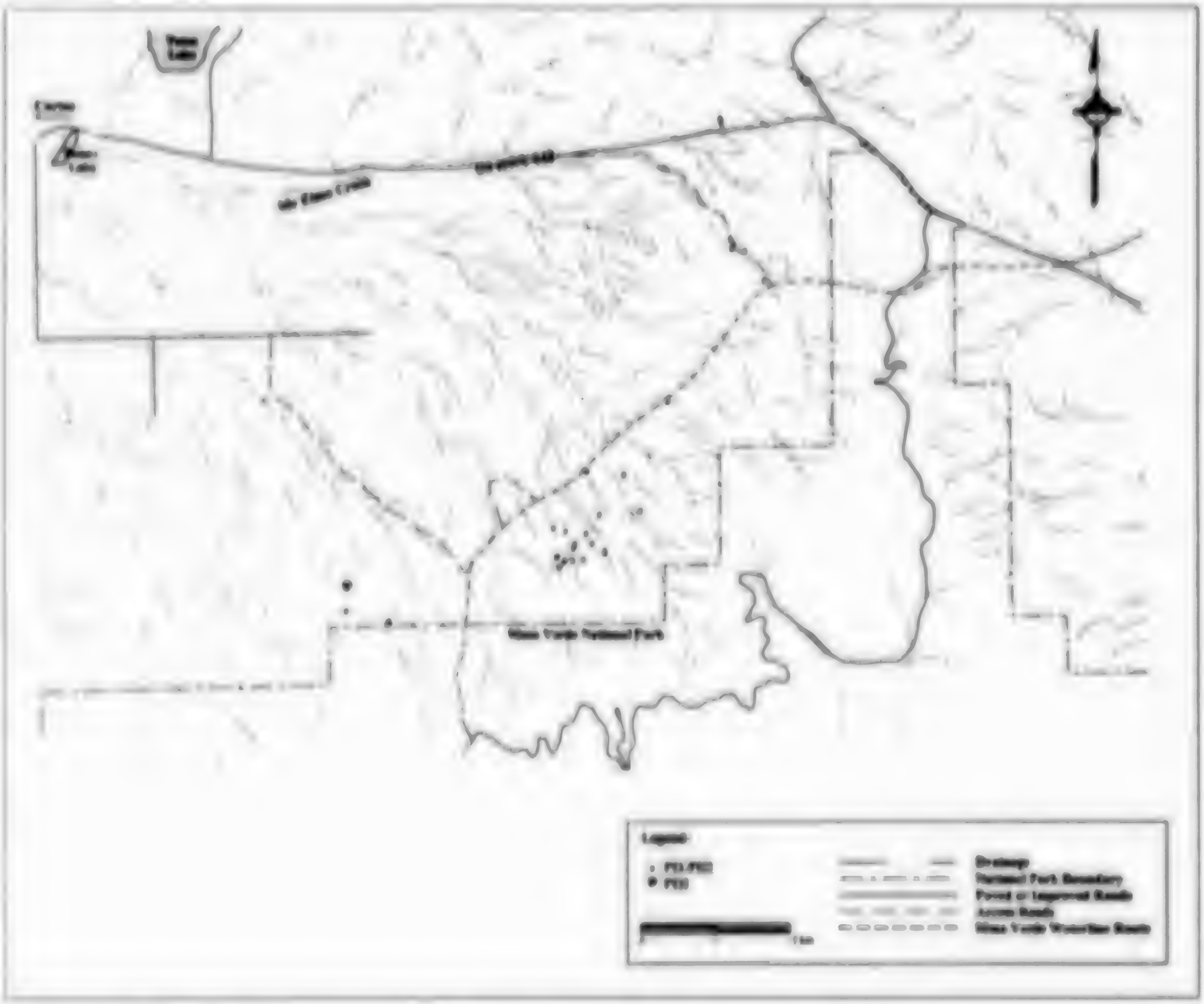


Figure 5.15. Distribution of known Pueblo III sites within the Montezuma Valley Segment.

II-Pueblo III habitation site (5MT11727) was located in the central portion of the Waterline Project. The majority of Pueblo III sites were found in the Hindmarsh Project Area, to the east on BLM-managed lands (5MT1928 and 5MT1929), and to the southwest (5MT1961 and 5MT10811). Only two Pueblo III isolated finds were recorded 5MT10801 and 5MT10486 a projectile point.

In general the Pueblo III sites were permanent habitations. Only one site was documented as a fieldhouse, 5MT10485 located a short distance northeast of the Hindmarsh Community. The other site recorded was a limited activity area 5MT10811 which could be possibly related to Pueblo III habitation site 5MT1961 also a short distance away to the southeast. All the rest of the fifteen sites were habitation sites with single rubble mounds or multiple, all but two had kiva depressions and most had middens. The location of these Pueblo III sites indicated that the heads of the drainages were more suitable for habitation. The sites appeared to cluster in a narrow 88 m elevational range from 2021 m (6630 ft) to 2110 m (6920 ft).

Within the Mesa Verde Waterline Replacement Project Area the Montezuma Valley Segment was depopulated in the lower portion of the McElmo Drainage by the end of Pueblo III times. Climatic conditions were probably a critical factor. With the population increasing in Pueblo II to Pueblo III times the natural resources were seriously depleted. Yet, within the project area there were no check dams, reservoirs, or terraces recorded such as those expected if increased new agricultural methods were employed by the prehistoric inhabitants (Eddy et al. 1984). That is not to say that these features are not present. By the latter half of the Pueblo III period the Montezuma Valley Segment of the project area was largely abandoned.

Shoshonean *Noochee* (Ute) and Athabaskan *Dineh* (Navajo)

After the abandonment by the Anasazi in the late Pueblo III period, the lands in the Montezuma Valley were probably void of human occupation. Mainly due to the depletion of natural resources (floral and faunal), soil depletion, misuse and the lack of water. It may have taken a few centuries for this area to recuperate from the overpopulation of the Anasazi occupation to attract human settlement into this area once again. The Numic speaking peoples were advancing through the Rocky Mountains and from the Great Basin area to the northwest as early as A.D. 1000. These groups possibly ventured into the outer fringes, the north of what is known as the Northern San Juan Anasazi area. It is possible that these peoples in earlier times prior to the abandonment in Pueblo III came into the area. It appears that these small bands migrated into the Montezuma Valley but there is little if any archeological evidence to suggest the time of their arrival. Further research into this phenomena is warranted. The ancestral Shoshonean speaking tribes such as the modern *Noochee* (Utes) were in the Montezuma Valley area as reported by the Spanish in the late 1500s early 1600s. The ancestral Athabaskan speaking tribes such as the modern *Dineh* (Navajo) came into the area after the *Noochee* (Utes) were already established in western Colorado. These two nomadic groups ventured into this region hunting and gathering resources in the higher and lower elevated lands. The histories and oral traditions passed down from generation to generation state that they have always lived in this area. During blading operations on the East Access Road a buried hearth was discovered at 5MT11709. The radiocarbon date of the hearth 160 + 60 BP (Beta 75291) A.D. 1790 (1730-1850) suggested that it was a protohistoric or historic feature, possibly utilized by either Navajo, Ute or by a Euro-American fur trapper. No artifacts were recovered from the hearth to support an hypothesis.

Historic Settlement, Roads, and Trails

Historic land use varied from homesteads with wheat fields, dairy, and sheep to short term resource procurement camps with roads and trails connecting the settlements. A total of 11 historic sites have been documented in the Montezuma Valley project area (Figure 5.16). Of therse, six homesteads and camps were found on preconstruction surveys. No additional historic sites were found during the construction phase. Historic trails and wagon roads crossed the waterline easement and the project access roads.

The historic sites found at the base of the North Escarpment primarily related to farming and ranching activities. Three homesteads of the late 1870s to early 1930s were found on the waterline easement: 5MT11568, the William Veach homestead (livestock, primarily sheep) (1870-1934); 5MT11563, the Henry

I. Hickey homestead (1917-1929) (Hickey was noted for his wheat thrashing machine.); and 5MT11453, the George and Perne Culp homestead (wheat and dairy) (1894-1929).

An additional homestead recorded within 1.6 km of the project area was 5MT5681, a log house, trash scatter, and still. This site was located near a spring, one of the few at the base of the North Escarpment. Site 5MT12048 was a 1918-1930 dugout, coal and trash scatter located to the north of U.S. Highway 160.

Two historic camps were found on the waterline easement. Site 5MT11455 was an axe hewn tent frame, brush corral and trash scatter (1920-1970). 5MT11569 was a recent sheep camp. Additional camps within 1.6 km of the project area included: 5MT7277, a tent platform, tin can midden (1935-1936); 5MT8339, an historic camp; 5MT10600, a sheep camp (1900-1935); and 5MT10816, two corrals, two tin cans, and a stockpond.

Historic roads and trails in the Montezuma Valley linked the homesteads and provided access to Mesa Verde, Cortez, and Mancos. The routes of these roads are shown on BLM base maps and the USGS topographic quadrangle maps for 1881 and 1915. During the construction of the 1950s West Fork Mancos Water Supply Line, the waterline and associated construction cut through some of these trails and wagon roads at the base of the North Escarpment including: the 1881 Montezuma Valley Wagon Road, Culp Homestead

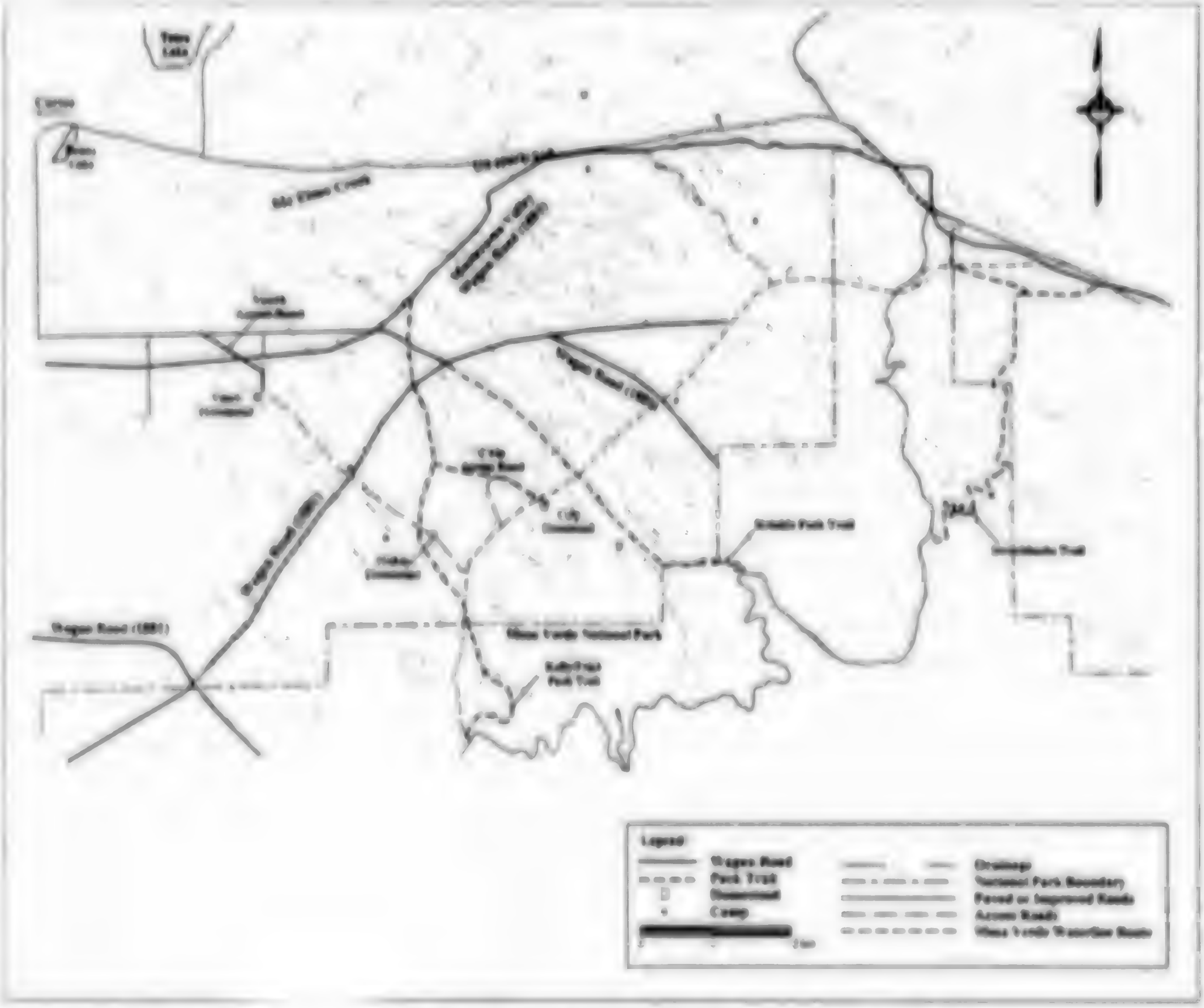


Figure 5.16. Distributio[illegible]n Historic sites and trails within the Montezuma Valley Segment.

Access Road, Veach Homestead Access Road, Kelly Pack Trail, Frink Pack Trail, Krinkle Pack Trail, and Switch-backs Trail.

The Montezuma Valley Wagon Road, a main access route from Mancos to Cortez, now part of U.S. Highway 160, was located in T36N, R14W, Sections 34,33,32,29, and 30; T36N, R15W, Sections 25, 26, 35, and 33; T35N, R15W, Sections 4, 5, and 6 (USGS Point Lookout and Cortez 7.5' quadrangle). The road is still visible in the Park Entrance Area and a portion of the East Access Road was a part of this wagon road.

Homestead access roads crossed the project area. A portion of the George and Perne Culp Road in : T35N, R15W, Sections 11 and 10 is now in part the waterline Center Loop Access Road. A portion of the West Access Road was part of the William Veach Access Road (5MT11568).

Major pack horse trails, Kelly, Frink, Krinkle, and Switch-backs, possibly established originally as foot trails by the Anasazi, were some of the few access routes from the Montezuma Valley into the Park during its development. The Kelly Pack Horse Trail began in T35N, R15W, Sections 22, 23, 14, 15, 10, and 3; T36N, R15W, Section 34 and met with the Montezuma Valley Wagon Road in Section 34. It merged with the Frink Trail which was located along the very top of the North Escarpment following the Rim. The merged Kelly/Frink trail was located on the rim of Mesa Verde at the base of "D-Cut" east of the waterline, it crossed the waterline at the base of the escarpment and then crossed the West Access Road near 5MT11563, the Henry I. Hickey Homestead, and connected with the Montezuma Wagon Road to the north. The Kelly/Frink Pack Trail merged with the Montezuma Valley Wagon Road in Section 10.

The Krinkle Pack Horse Trail began at the junction of the Montezuma Valley Overlook in the Park and the old Knife Edge Trail in T35N, R14W Section 18; T35N, R15W, Sections 13, 12, 11, 2, and 3 and headed in a northwesterly direction passing a homestead and a sheep camp. The Krinkle Pack Trail merged with the Kelly/Frink Pack Trail in Section 3. The Switchbacks Trail began at "Nusbaum Cut" along the eastern side of the Park, and headed in a northerly direction. A waterline that services Morefield Campground follows this trail.

Within 1.6 km on the project area, the Krueger and Todd Mine Trail is located on the North Escarpment of the Mesa Verde Plateau just west and outside of the Park boundaries.

Recommendations for Future Work in the Montezuma Valley Segment

An intensive cultural resource inventory of the federal, state, and private lands under the North Rim of Mesa Verde is warranted to gain an accurate picture of the site density and chronology represented in the area. Comprehensive survey and testing would provide data to understand the settlement distribution, social, political, economic, and religious aspects of the prehistoric settlers who inhabited the Montezuma Valley. The North and East Escarpments of Mesa Verde need to be surveyed for cultural resources understand the interaction between the prehistoric inhabitants in the Montezuma Valley and their neighbors on Mesa Verde.

Understanding the use of water in the Montezuma Valley is important to the understanding of the prehistory. Locating springs, seeps, check dams, terraces, reservoirs, and canals in the project area should be an important focus of the future research in the Montezuma Valley to understand how the entire habitation system worked in the collection and distribution of water, the life line for any population.

Summary of Montezuma Valley Segment

In the Montezuma Valley Segment of the Mesa Verde Waterline Replacement Project, parts of the 9.7 km (6 mi) long 60 m wide pipeline right-of-way and 7.7 km (4.8 mi) of access roads were surveyed and all areas were monitored during construction. An additional 18.6 ha (46.04 a) were intensively surveyed and monitored during construction. In the Montezuma Valley Segment adverse effects to 10 archeological sites (5MT11668, 5MT11706, 5MT11708, 5MT11709, 5MT11710, 5MT11711, 5MT11712, 5MT11727, 5MT117728, and 5MT11729) and 10 isolated finds (5MT11707, 5MT11713, 5MT11714, 5MT11715, 5MT11716, 5MT11717, 5MT11718, 5MT11724, 5MT11725, and 5MT11726) were mitigated.

Chapter 5 Section 3: Mesa Verde National Park Segment: Park Entrance, Morefield Campground, Navajo Hill-Far View, and Chapin Mesa

The Mesa Verde Waterline Replacement Project, Phase III affected archeological sites in four areas of Mesa Verde National Park: Park Entrance, Morefield Campground, Navajo Hill-Far View, and Chapin Mesa (Figure 5.17). Each of the four areas is considered separately including a brief overview of the previous archeological work followed by a description and evaluation of the archeological sites and isolated finds discovered during the Project. Finally there will be a discussion of how these discoveries relate to the prehistoric settlement pattern. Historic aspects are discussed in a separate chapter.

A total of 5 ha (12.5 a) was surveyed and 21 km (13 mi) segment of pipeline construction was monitored during the Mesa Verde Waterline Replacement Project Phase III construction in the Mesa Verde Segment. As a result of the survey and monitoring work, 15 new sites were recorded in Mesa Verde National Park. There were two discoveries in the Park Entrance Area (5MV3977, historic homestead; 5MV3980, Archaic/Basketmaker II Projectile Point). Two sites were discovered in Morefield Campground (5MV3975, Ceramic; and 5MV3976, Pueblo II-III Artifact Concentration). There were no new sites discovered in the Navajo Hill-Far View Area. Eleven sites were discovered on Chapin Mesa and effects of the pipeline construction on three previously recorded sites were mitigated. Ten of the new sites on Chapin Mesa were buried features which were exposed by the pipeline construction during monitoring (5MV3966, kiln and historic trash pit; 5MV3967, kiln; 5MV3969, kiln; 5MV3970, hearth; 5MV3971, bell shaped pit; 5MV3972, kiln; 5MV3973, historic utility trenches; 5MV3978, burial; 5MV3982, kiln; and 5MV3987, hearth). The eleventh site found on Chapin Mesa during construction was a projectile point (5MV3984).

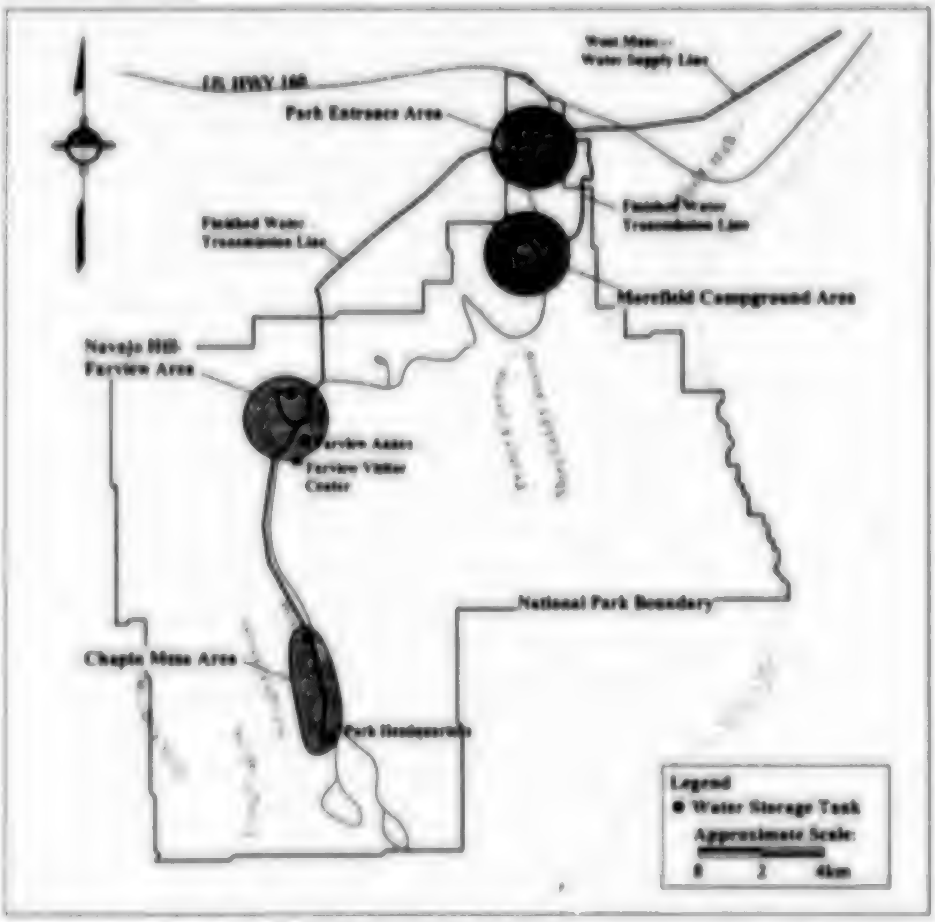


Figure 5.17. Mesa Verde Park Segment showing the four areas: Park Entrance Area, Morefield Campground Area, Navajo Hill-Farview Area, and Chapin Mesa Area.

Three sites previously recorded on Chapin Mesa were affected by the pipeline project (5MV3899, kiln; 5MV3942, historic and prehistoric check dam; and 5MV3945, kiln).

Environmental Contexts of Project Survey Areas Within Mesa Verde National Park

Park Entrance Area

The Mesa Verde Waterline Replacement Project Phase III survey area around the Park Entrance straddled the divide between the Mancos and Montezuma Valleys between 2109 m (6920 ft) and 2170 m (7120 ft) elevation. The characteristic vegetation of the entire area consists of sagebrush community. The pipeline crossed the entrance road south of the entrance kiosks and headed west through dense pinyon-juniper-scrub oak woodland, to the western boundary of the Park. The pipeline survey area began at the Phase II valve box, traversed southwesterly on the eastern side of the Park entrance road, turned due west from the Park's kiosks to the western Park boundary. This section of pipeline was 1.8 km long.

Morefield Campground Area

The Morefield Campground distribution system is located at the head of Morefield Canyon at an elevation of 2402 m (7880 ft) 4.8 km (3 mi) south of the Park Entrance. The campground is serviced from the existing West Mancos Supply Line by means of a finished water transmission line built in the 1960s along the base of the East Escarpment. Four high isolated mesas covered with pinyon-juniper forest surround the campground which is situated in the canyon valley among large stands of scrub oak. To the north is Point Lookout ridge reaching an elevation of 2569 m (8427 ft). To the east and southeast is the East Rim, elevation 2504 m (8216 ft). Prater Ridge is located to the southwest at an elevation of 2566 m (8418 ft); and Lone Cone is located to the northwest at an elevation of 2530 m (8302 ft).

The Morefield Campground survey area followed the finished water transmission line south from County Road H.5 along the "Switchback Trail" through "Nusbaum Cut" to the Morefield Water Storage Tank (300,000 gal). The pipeline was constructed in a talus debris slope derived from the Cliff House Sandstone consisting of large angular boulders (as large as 40 cubic yards) in a matrix of red silty clay and sand. The boulders ..."are tightly compacted on the upper section of this distribution system around the water tank and decrease to a few sporadic boulders down around the Ranger Station with red silty clay being the prominent material" (Amber 1991:5-6). Approximately 877 m (2877 ft) of pipe was replaced in the winter of 1992 because it was leaking and in need of repair. The pipeline replacement began at the Water Storage Tank, located on the northern side of Kiva Point and followed the access road to the tank in a westerly direction. From the access road the pipeline drops downslope to the "Zuni Loop" road and follows the road pealing off in a southerly direction toward the Morefield Gift Shop. The pipeline was placed on the north side of the building heading in an easterly direction then turned south to a fire hydrant on the west side of the Morefield Ranger Station.

Navajo Hill-Far View Area

Navajo Hill-Far View is located 24 km (15 mi) from the Park Entrance in T35N, R15W, Sections 28 and 17 on the north rim, at the upper end of Chapin Mesa bordered by the West Fork of Little Soda Canyon to the east and the East Fork of Navajo Canyon on the west. This visitor complex is serviced with water from the West Mancos Supply Line which splits at a valve box on the north side of Navajo Hill. Water is then diverted to the Navajo Hill Water Storage Tank (2,000,000 gallon tank) located to the north of Navajo Hill at an elevation of 2541 m (8335 ft). This large storage tank supplies water to Wetherill Mesa and the Navajo Hill-Far View complex. Approximately 349 m (1145 ft) of pipeline was replaced from a valve box and along the access road to the Far View Lodge.

Navajo Hill-Far View Complex distribution system is located at the head of Chapin Mesa at an elevation of 2475 m (8120 ft). The vegetation surrounding the project area is dense scrub oak. To the east is the West Fork Little Soda Canyon and to the west is the East Fork Navajo Canyon. Navajo Hill is located on the Menefee Formation which consists of brown woody to carboniferous shale beds in the upper and lower part of the section with middle sandy units and noncontinuous old stream fills interbedded.

Chapin Mesa From the Million Gallon Tank to Park Headquarters

The fourth area of construction and archeological survey was concentrated on Chapin Mesa, from the Chapin Mesa Water Storage Tank to the Park Headquarters. From the valve box on the north side of Navajo Hill the existing waterline traverses downslope along the Chapin Mesa Road to the Chapin Mesa Storage Tank, more commonly known as the Million Gallon Tank. The tank is located approximately 1.6 km north of Park Headquarters. The tank services the lower portion of Chapin Mesa and the ancillary facilities. Approximately 4514 m (14,811 ft) of pipe was replaced. This included not only the replacement of numerous sections of the mainline but additional laterals called "spurs", service and distribution lines to ECW Utility Area, Maintenance, the Stone House Loop, the White House Loop (employee housing) and the Headquarters area.

The Chapin Mesa survey area followed the water distribution system beginning at the Million Gallon Tank at an elevation of 2195 m (7200 ft) and traversing in a southerly direction to the Park Headquarters area at an elevation of 2112 m (6929 ft). The area is very dense pinyon-juniper shrub forest which has never been allowed to burn in recent history due to the historic buildings located in this area. The overgrowth is incredibly thick with old forest and new growth. The entire distribution system was placed in the Cliff House Sandstone, a yellowish to brown, fine to medium grained cross bedded to evenly bedded marine sandstone deposit. A portion of Chapin Mesa has a red silty clay and sand layer over the sandstone, however, it is relatively thin and the Cliff House Sandstone is at a depth of 60-90 cm. The Park Headquarters area has a very thin 15-30 cm layer of material which is composed of silt, sand and gravel, along with some organic material covering Cliff House Sandstone (Amber 1991:5).

Prehistoric Context

As a whole, Mesa Verde National Park is located in the Mancos Drainage Unit, defined as all of the lands drained by the Mancos River (Eddy et al. 1984). "No other drainage unit in the project area has witnessed as much past archaeological work as the Mancos Drainage Unit, largely due to the presence of Mesa Verde National Park with its internationally known ruins" (Eddy et al. 1984: 57)

The earliest evidence of human habitation in the Mancos Drainage Unit is of the Late Archaic-Early Basketmaker II (ca. 1000 B.C.-A.D. 450). Sites of this antiquity were found as a result of archaeological survey associated with the Mesa Verde Waterline Replacement Project Phase III in the Mancos Drainage in the vicinity of Chicken Creek, and in the area of the Park Entrance. Based on the presence of diagnostic projectile points, Chapin Mesa may have had some limited occupations of Archaic and Basketmaker II peoples (Rohn 1977:232).

Most of Mesa Verde National Park was intensively occupied by prehistoric inhabitants from the Basketmaker III period through Pueblo III periods (A.D. 450-1300). There were several early attempts to establish a classification system to describe the various prehistoric Pueblo occupations within the unit. (Gladwin and Gladwin 1934; O'Bryan 1950; and Reed 1958). Alden Hayes developed a phase sequence for the western portion of the Park during the Wetherill Mesa Survey (Hayes 1964). This system is presently used with slight variations, depending on the area in which the field work is conducted. Based largely on survey data from Chapin Mesa, another phase system was developed (Rohn 1977).

In the Mancos Drainage Unit there are no known archeological sites relating to the post-Anasazi Period A.D. 1300-Historic, but it is possible there were ancestral Shoshonean (Ute) and Athabascan (Navajo) people in the area. It is highly probable that after the Anasazi abandonment, environmentally speaking, the area was so severely depleted of plant and animal resources that it may have been unsuitable for migrating bands to utilize. As the vegetation and the faunal resources started to recover, the area was most likely visited and utilized.

Historic Context

The Historic Context for Mesa Verde National Park and the project area is discussed in the Historic Studies Chapter of this report.

Previous Research In Mesa Verde National Park

A tremendous amount of archeological research work was conducted by early explorers, scientists and archeologists in the Park prior to the development of the Park, during Park development, up to the present time. Smith (1987) provides further details of the history of archeological research in Mesa Verde National Park.

For the Mesa Verde Waterline Replacement Project Phase III, a cultural resource file search was conducted for the Park Entrance Area in T36N, R14W Sections 32 and 29, the Morefield Campground Area T35N, R14W Sections 5, 7, 8, 9, 16, 17, and 18; for the Navajo Hill-Far View Area in T35N, R15W, Sections 28 and 17; and for Chapin Mesa surrounding the Park Headquarters in unsectioned, T34N, R15W. In June 1992, a formal deed search was conducted at the Montezuma County Courthouse, Cortez, Colorado. The results of these searches indicated that, prior to the Mesa Verde Waterline Replacement Project Phase III, 13 prehistoric and historic sites were recorded in the Park Entrance Area, 34 prehistoric and historic sites were recorded within a 1.6 km radius of the project area in Morefield Canyon; 148 sites were recorded in the Navajo Hill-Far View area; and 500 sites were recorded for the Chapin Mesa area from the Million Gallon Tank to Park Headquarters.

Early archeological surveys of Mesa Verde National Park, focused on the famed major cliff dwellings within the canyons of the Park. In 1906, Edgar L. Hewett, Director of American Archaeology for the Archaeological Institute of America, was commissioned by the Smithsonian Institution and a project was initiated by the Department of the Interior, to survey boundary lines and to evaluate the ruins of Mesa Verde. In 1907, Hewett, by then the Director of the School of American Archaeology, was assisted by ..."three students from Harvard University, Alfred V. Kidder, Sylvanus G. Morley, and John G. Fletcher." The purpose of the survey ..."included recommendations for the excavation and stabilization of the major cliff dwellings on Chapin Mesa, development of roads and trails, and the construction of a park museum" (Smith 1987:8).

The Bureau of American Ethnology selected Jessie W. Fewkes in 1908 to begin a program of excavation and stabilization of ruins mainly on Chapin Mesa. The purpose was to open various sites for visitation. These included Spruce Tree House (5MV640), Cliff Palace (5MV625) and Balcony House (5MV615). In 1915, Fewkes returned and worked at Sun Temple (5MV352), Oak Tree House (5MV523), and Far View House (5MV808). With the outbreak of World War I all archeological field work was halted in the Park until 1919, when Fewkes continued excavations at Square Tower House (5MV650), and conducted several smaller excavations on the mesa tops. By 1920 Fewkes was working in Fire Temple (5MV520), New Fire House (5MV522), Sunset House (5MV626), Buried Cave (5MV519) and Cedar Tree Tower (5MV397). In 1921 Fewkes investigated only one cliff dwelling, Painted Kiva House (5MV557). In Fewkes final year of excavation in the Park, he returned to the Far View area investigating Pipe Shrine House (5MV809), One Clan House (5MV835), Far View Tower (5MV810) and Megalithic House (5MV790) (Smith 1987:9-10).

Although Superintendent Jessie L. Nusbaum prevented unauthorized excavations within the Park in 1923, several archeological sites were discovered including an extensive series of check dams (5MV395), a large petroglyph panel (5MV1001), cliff dwelling 20 ½ House (5MV1559), and an isolated tower (5MV1183). In 1929 Nusbaum and Earl H. Morris investigated Mummy Lake (5MV833), to determine the function of that structure (Smith 1987:11-13).

Little progress was made in the form of archeological surveys within the Park's boundaries after Hewett's work until 1929, when two archeological survey projects were begun. One, developed by Superintendent Jessie Nusbaum and Chief Ranger Marshall Finnan, was a six-week survey and mapping program of the major cliff dwellings which was carried out by Harold S. Gladwin and Winifred MacCurdy of Gila Pueblo, Arizona. Gladwin and MacCurdy focused their work on the mesa tops and canyon bottoms. Assisted by Jessie Nusbaum's nephew Deric (Nusbaum) O'Bryan, Gladwin and his crew surveyed Morefield and Prater Canyon, Chapin Mesa and the northwestern corner of the Park's boundary. Galdwin realized that the major cliff dwellings comprised only a small fraction of the cultural resources within the Park. Gladwin located sites on 1915 USGS topographic quad maps and was the first to use the marker system on open sites. He painted site numbers on a stake for a site datum and this system became the standard method of site identification. Gladwin established the basic techniques and methodologies used in archeological surveys to this day (Smith 1987:13-14).

In 1934 a major fire on Wetherill and Long Mesa exposed numerous prehistoric sites, which were brought to the attention of Park Naturalist, Paul Franke. There was no funding to conduct proper surveys within the burned area, so Franke and two volunteers recorded these sites. The major factor in preventing a large scale cultural resource inventory was the lack of funding due to "The Great Depression." To overcome the financial obstacle, Franke proposed to recruit the Civilian Conservation Corp (CCC) men and use them as field survey crews supervised by an archeologist. The project was never approved and was postponed indefinitely. Franke continued to work on developing a Park-wide survey as a result of the Wetherill Mesa fire which exposed so many prehistoric sites (Smith 1987:15).

While excavating a waterline trench south of the Million Gallon Tank (5MV3989) in 1939 a Basketmaker III pithouse was discovered and excavated. The site was designated as "Pithouse No. 1" (5MV405) (Smiley and Watson 1949).

In 1939, Guy R. Stewart of the Soil Conservation Service, United States Department of Agriculture began studies on prehistoric water catchment and conservation practices on Chapin Mesa (Stewart 1940; Stewart and Donnelly 1943).

Park Naturalist, Don Watson attempted to establish a cultural resources inventory program in 1941. The survey was expected to enhance the interpretive program of the Park. But the outbreak of World War II canceled all hopes of such a program until after the war. During the war years Deric (Nusbaum) O'Bryan collected dendrochronological samples for the tree-ring chronology program at the institute at Gila Pueblo. James A. Lancaster and Don Watson were assisted by a CCC crew in the excavations of several mesa top sites on Chapin Mesa (Smith 1987:16).

After World War II several archeological projects focused on further research into the Park's prehistoric resources and developed interpretive displays. In 1949, Don Watson, Park Archeologist, attempted to establish the proposed park-wide cultural resource inventory, but the cost was still prohibitive. Therefore, Watson scaled down the survey and decided to focus on Chapin Mesa which contained the most dense concentration of prehistoric sites. Watson's survey proposal was finally approved. In the fall of 1951, the survey of Chapin Mesa began and was administered by Don Watson, Park Archeologist. Field operations were directed by James A. Lancaster. Fred Peck, Robert Bradley, and Leland Abel assisted in the survey until the fall of 1954. Arthur Rohn analyzed, resurveyed and discovered additional sites on Chapin Mesa. Al Lancaster continued a non-systematic survey throughout the Park in Whites Canyon, Whites Mesa, Big Mesa, Moccasin Mesa, Prater and Morefield Canyons (Smith 1987:17-18).

The Department of Anthropology of the University of Colorado under Robert H. Lister, conducted archeological research in the Park from 1953 through 1956. Field work during those seasons focused on excavation of three sites (5MV499, 5MV875 and 5MV866) located in the Far View Ruin group of Chapin Mesa (Lister 1968:1).

In 1958 the Wetherill Mesa Archeological Project was one of the largest and most extensive archeological projects including survey and salvage excavations of major cliff dwellings and mesa top sites. This project evolved out of the National Park Service's "Mission 66", as part of a large master plan which would result in a major rearrangement of the Park's facilities to accommodate the ever increasing numbers of visitors. Wetherill Mesa was selected for the site of the Park's new archeological expansion which included ancillary facilities to accommodate the visitor needs. The project continued through 1965 (Hayes 1964:1-2).

In 1962 under "Mission 66," plans to develop a new 500 site campground located in the upper portion of Morefield Canyon necessitated a cultural resources inventory conducted by Al Lancaster, Arthur Rohn, George Cationic, with the assistance of Jack Rudy and David A. Decker. Alden Hayes conducted a survey south of the present tunnel in Morefield Canyon. The construction of two sewage lagoons which service Morefield Campground was inventoried. In May 1963, Al Lancaster began salvage excavation of site 5MV885 (a Pueblo II site of three rooms, one kiva, and a tower) located on Navajo Hill-Far View. The location was selected for the future Visitor Center and to realign the road (Smith 1987:19-20). Salvage excavations under the direction of Al Lancaster and David Decker continued at Navajo Hill through 1964 with the excavation of habitation site 5MV1914 consisting of a 16 room and one kiva late Pueblo II-early Pueblo III site located in the right-of-way of the newly proposed road (Hewitt 1968).

During the field season of 1965, the University of Colorado Archaeological Research Center conducted excavations in Morefield Campground at sites 5MV1086 and 5MV1088, in the vicinity of the Morefield Water Storage Tank (300,000 gallon tank). Site 5MV1086 was an above ground kiva, and site 5MV1088 was a large Pueblo II site with 17 rooms and 2 kivas.

Along the East Fork of Navajo Canyon, two sites were tested along the Wetherill Mesa Road west of Navajo Hill-Far View. The road was realigned and widened affecting the cultural resources. Both sites 5MV1093 and 5MV1094 were Pueblo II habitations, only the middens were affected and tested. The University of Colorado returned to the Far View Ruin group and excavated Coyote Village (5MV820). From 1971 through 1977 the University focused on the survey of the remaining unsurveyed portions of the Park. The report states that 1,897 prehistoric and historic sites were recorded (Smith 1987:59).

In the fall of 1984 and summer of 1985, P-III Associates, Inc., Salt Lake City, Utah conducted a cadastral survey on Chapin Mesa. There are approximately 900 sites located on Chapin Mesa although the exact location of these sites was uncertain prior to the project. Given the management preservation needs for accurate site locations it became necessary to conduct this type of survey. The main focus of the project was to relocate previously recorded archeological sites and record newly discovered sites encountered during the course of the project. A total of 525 previously recorded sites were located and seven new sites were found and reported (Lucius and Schroedl 1986).

In 1989 and then again in 1991, Kathleen Fiero conducted a cultural resources inventory for replacement and relocation of ten power line poles near the north boundary of the Park to Navajo Hill-Far View, for Empire Electric Association, Cortez, Colorado. The entire power line corridor was intensively surveyed resulting in the discovery of a lithic and ceramic scatter (5MV3935) near a power-pole. The site was avoided during the replacement of that pole (Fiero 1991).

Numerous NPS construction projects have been conducted within the four areas for the waterline project and have been surveyed for cultural resources in the form of Section 106 clearances, assessment of effect, and small Park projects. All of these reports are curated the Mesa Verde Research Center.

The Division of Research and Resource Management for the past few years has been involved in the Global Positioning System (GPS)/Global Information System (GIS) to relocate previously recorded sites more accurately within the Park. This included using the equipment on the waterline corridor to locate the sites bordering and within the right-of-way. The entire Park has not been systematically surveyed for cultural resources especially in areas along the North and East Escarpments and in the western portion of the Park.

Park Entrance Area Previous Research

Thirteen archeological sites were previously recorded within the Park Entrance survey area between 2109-2170 m (6920-7120 ft) elevation (Lancaster and Goff 1961, Smith 1977, Smith and Collins 1987, Smith 1990, Weeth 1992) (Appendix B Table B.3).

As early as 1961, an archeological survey of a proposed reservoir, located in the southwest quarter of the northwest quarter of Section 32, near the Park Entrance Area was conducted by Al Lancaster, Charlie Decker, and Lester Goff. There are no records of the amount of area covered in that survey. One Basketmaker III-Pueblo I rubble mound (5MV1069) was observed and recorded.

During the field season of 1977, the University of Colorado conducted a cultural resources inventory within Section 32 (the Park Entrance Area). One prehistoric site (5MV3386), a Pueblo II surface habitation site, three historic Navajo Sweat Lodges (5MV3880, 3881, 3887), and one historic trash dump (5MV3888) were recorded. A total of five prehistoric and historic cultural remains were recorded in Section 32.

On September 17, 1987, Chief Park Archeologist, Jack Smith, and Susan Collins conducted an intensive survey of a proposed project area for the Park Entrance

Comprehensive Design Plan. This area is located between 244 m (800 ft) to 305 m (1000 ft) southwest from the Park Entrance kiosks. The Assessment for the Park Entrance Comprehensive Design Plan (1988) stated that this area has been designated for the future visitor center and research facility. Two Archaic camp sites (5MV3902 and 5MV3903), and one isolated find (MEVE 205/50411, a possible core chopper) were found on the survey (Smith 1987).

In 1989, Chief Park Archeologist, Jack Smith, conducted a cultural resources inventory for the new Water Treatment Plant, a waterline, and an access road. The project area was located west of the Park Entrance. A block survey measuring 229 m (750 ft) NW-SE by 73 m (240 ft) NE-SW was inventoried. The length of the waterline was approximately 874 m (2780 ft) from the Water Treatment Plant to existing valve box, PRV #5 (Pressure Reducing Valve). The access road was approximately 220 m (720 ft) from the Treatment Facility to the Park Entrance Road. According to the Assessment of Effect Form, no cultural resources were found within the areas to be affected (Smith 1989).

In 1990, an area surrounding the Water Treatment Plant was archeologically surveyed by Chief Park Archeologist, Jack Smith, and Susan Collins. This area was proposed for permanent and seasonal employee housing. Two historic sites, 5MV3933, the entrance outhouse, and 5MV3934, the Park Entrance trash dump, were discovered and recorded (Smith 1990).

While the new Water Treatment Plant was under construction, two additional areas were impacted in the Park Entrance area because of the construction of a septic tank, leach field, sludge basin, drains, and installation of electrical lines. One area was located north of the facility, and the other was located to the east of the Water Treatment Plant. According to the Assessment of Effect Form, neither of the areas contained cultural resources (Smith 1990a).

As part a survey for Phase II of the Mesa Verde Waterline Project, the park service lands in the Park Entrance area were surveyed by the Chief Park Archeologist, Jack Smith. No cultural resources were observed within the Park's boundary (Dominguez 1990).

Flint Research Associates of Cortez, Colorado, conducted a Class III intensive archeological inventory of Mesa Verde National Park's existing waterline right-of-way in 1991. The survey included areas from the present location of the Park Entrance Kiosks, southwest to the north rim of the mesa. Within the Park's boundary, approximately 1.6 km (1 mi) of existing waterline in the Park was surveyed. A corridor width of 61 m (200 ft) of the waterline was inventoried. Within the Park boundaries no cultural resources were found.

On July 22, 1992, the Mesa Verde Waterline archeological staff conducted a cultural resources inventory for the proposed Bookstore Repository for the Mesa Verde Museum Association. The project area was located west of and adjacent to the new Water Treatment Plant. An area of 110 m (360 ft) N-S by 79 m (260 ft) was examined. One Archaic lithic scatter (5MV3981) was recorded and tested for subsurface remains (Weeth 1992).

Morefield Campground Area Previous Research

Within a 1.6 km radius of Morefield Campground, 34 prehistoric and historic sites have been recorded. Of the sites found in this area 21 were Pueblo II, 5 sites were Pueblo II-III, one was Pueblo III, two were historic, and 5 sites did not contain enough information to determine a time of use other than Prehistoric. The majority of the sites previously recorded appeared to be habitation sites (Appendix B Table B.4).

Navajo Hill-Far View Previous Research

Within a 1.6 km radius of the Navajo Hill-Far View area 148 prehistoric and historic sites have been recorded (Appendix B Table B.5). One site was assigned to Basketmaker III-Pueblo I and one site had evidence of continuous occupation from Basketmaker III-Pueblo III. Only one site was recorded as Pueblo I, and two sites were of the Pueblo I-Pueblo II period. The majority of the sites, (61) found in this area were Pueblo II sites. Thirty-seven sites were Pueblo II-Pueblo III, and only 15 sites were Pueblo III, the majority of which were mesa top and canyon bottom habitations. Only one cliff dwelling was found in the Navajo Hill-Far View area. Six historic period sites were found, and 24 other sites did not contain enough information to determine a time period of use more closely than Prehistoric. The majority of sites were habitation located at the heads of two drainage systems (East Fork

Navajo Canyon and West Fork Little Soda Canyon) and the north rim.

Chapin Mesa Previous Research

The site density of Chapin Mesa is high. Previous research documentation had to be limited to the 500 sites reported in an area demarcated by the Navajo Canyon bottom to the west, the "Old Ute Reservation Boundary Line" or Township 34N line to the north of the Million Gallon Tank, Soda Canyon bottom to the east, and to the south a 1.6 km crescent including the upper portions of "Ruins Road" and "Cliff Palace-Balcony House Road". This area included most of Spruce Canyon and the upper portions of Cliff Canyon. There were 20 Basketmaker III sites, 42 Basketmaker III-Pueblo I sites, one multi-component Basketmaker III-Pueblo II site, and one site which had evidence of continuous occupation from Basketmaker III-Pueblo III. There were 91 Pueblo I sites, 27 Pueblo I-Pueblo II sites, and one Pueblo I-Pueblo III site. The majority of the sites recorded within 1.6 km radius of the project were the 137 Pueblo II sites. Only 12 Pueblo II-Pueblo III sites were previously recorded. There were 102 Pueblo III sites which were mainly cliff dwellings or cliff storage. There were 23 historic sites. Forty-one sites did not have enough information to determine the time period of use other than to indicate they were prehistoric (Appendix B Table B.6).

Mesa Verde Waterline Replacement Project Phase III Cultural Resource Inventory and Results

Park Entrance Area (5MV3977, 5MT3980)

In the Park Entrance area, as a result of the Mesa Verde Waterline Replacement Project Survey, two archeological sites were found and recorded: 5MV3977, the Mallet Homestead; and 5MV3980, an Archaic/ Basketmaker II projectile point (Figure 5.18).

One historic site (5MV3977), the Mallet Homestead, dating from 1870s to 1950s, was recorded during a 1992 pedestrian survey conducted on a portion of the Waterline Replacement Project, Phase III which was not included in the preliminary surveys. A segment of the waterline 701 m (2300 ft) in length and 61 m (200 ft) wide was examined east of the Park Entrance Kiosks and north to the existing valve box, PRV (Pressure Reducing Valve) Station #5. The Mallet Homestead was directly in the right-of-way so the pipeline was rerouted around the site to protect it from construction activities.

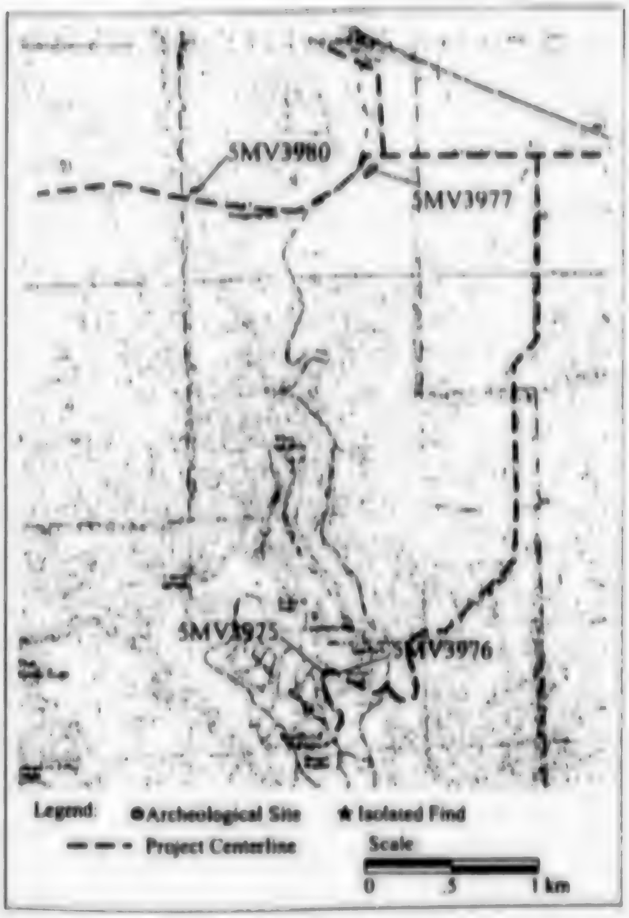


Figure 5.18. Newly discovered archeological sites in the Park Entrance and Morefield Campground Areas.

During the blading operations on the right-of-way, an isolated find (5MV3980), an Archaic/Basketmaker II projectile point was recorded towards the western boundary line of the Park, within the waterline corridor. The large corner-notched projectile point made of fine grained quartzite was found along a high ridgeline on the western boundary of the Park.

Four previously recorded sites (5MV3881, 5MV3933, 5MV3934, 5MV3977) were observed near the proposed project area for the Raw and Finished Water Systems Project in the Park Entrance Area (Ives and Brisbin 1994). On August 29, 1994, Mesa Verde Waterline archeologists from the Division of Research and Resource Management conducted a Class II cultural resources inventory for the proposed Raw and Finished Water Systems Project. The location of this project included the Water Treatment Plant, Phase I and Phase III waterline corridor, from the Park Entrance Trailer to the Valve Box PRV (Pressure Reducing Valve) Station #5. The project involved modifications within the Water Treatment Plant and outside of the facility and installing a 100,000 gallon concrete raw water tank in the parking lot north of the Park entrance kiosks. A new dual steel pipeline approximately 427 m (1400 ft) from the Parking lot to PRV #5 was installed along the Phase III waterline corridor. Electrical power and control lines will be installed underground, approximately 1263 m (4145 ft) from the new 100,000 gallon tank to the Water Treatment Plant using the Phase I and Phase III waterline corridor. Electrical power and control lines at a distance of 317 m (1040 ft) from the proposed new tank to the Park Entrance Trailer were installed using the Phase III waterline corridor. The project also will provide fire protection to Residence #41 by installing a new waterline and fire hydrant.

Morefield Campground Area (5MV3975, 5MV3976)

Two sites were encountered just west of the Morefield Campground Water Storage Tank on the access road during trenching activities associated with the Mesa Verde Waterline Replacement Project Phase III survey for the Morefield Campground distribution system in February 1992: isolated find 5MV3975, and 5MV3976, a concentration of lithics and ceramics (Table 5.6). 5MV3976, the artifact concentration was found in the upper 10 cm level of the trench on the access road. These sites are probably related to 5MV1088 a Late Pueblo II-Early Pueblo III habitation located near to the present Morefield Campground Water Storage Tank. The site which consisted of 17 rooms, 2 kivas, and a midden was excavated, backfilled, and partially removed in 1965.

Navajo Hill-Far View

Prior to construction a reconnaissance of the proposed line at Navajo Hill-Far View was conducted by the Division of Cultural Resources indicating that no cultural resources were observed within or adjacent to right-of-way (Smith 1991b). During construction of the Navajo Hill-Far View distribution system no cultural resources were encountered.

Chapin Mesa

In the Chapin Mesa area of Mesa Verde National Park, numerous historic features were located on the Mesa Verde Waterline right-of-way such as masonry lined culverts, curve stones, and historic structures that were not documented prior to construction. The waterline project would affect almost every building located south of the Million Gallon Tank. During construction of the waterline all historic features were fenced, avoided,

Table 5.6. Mesa Verde Segment, Park Entrance and Morefield Campground Newly Recorded Sites

Site Number	Elevation m (ft)	Cultural Affiliation	Site Type	Site Function
5MV3977	2143 (7030)	Historic	Homestead	Farming
5MV3980		Archaic/Basketmaker II	Isolated Find	Projectile Point
5MV3975	2433 (7980)	Anasazi	Isolated Find	Ceramics
5MV3976	2411 (7907)	Pueblo II-III	Artifact Concentration	Refuse from 5MV1088
Total = 4				

and monitored to protect the resources. In most cases the features and known sites were avoided but eventually one site 5MV3899 had to be mitigated.

During blading and trenching activities 11 sites were discovered: eight prehistoric sites (5MV3966, 5MV3967, 5MV3969, 5MV3970, 5MV3971, 5MV3972, 5MV3978, 5MV3982), two historic sites (5MV3973 and 5MV3987), and one isolated find (5MV3984). Two prehistoric sites were reevaluated (5MV3945 and 5MV3899), and one prehistoric/historic site was reevaluated (5MV3942) (Table 5.7 and Figure 5.19).

During the Mesa Verde Waterline Replacement Project, on June 1, 1993, Bruce J. Noble, Jr. from the National Park Service-Interagency Resources Division-Preservation Planning Branch, Washington D.C., submitted a document to nominate to the National Register of Historic Places, 6 multiple property groups on Chapin Mesa. These properties were related to two historic contexts: 1. The Establishment of Early National Park Service Administrative Facilities in Mesa Verde National Park, 1921-1931 and 2. Depression-era Development in Mesa Verde National Park, 1931-1942. The six nominated historic districts are the CCC Camp (a combination of sites 5MV3938 and 5MV3939), Residential Area (5MV3991), Utility Area (5MV3990), Navajo Hogan (5MV3992), Campground (5MV3941). A seventh district, the Mesa Verde Administrative District, was recorded in 1987 on the National Register as Site 5MT9790 in Montezuma County. It includes 5MV3962, the Spruce Tree Maintenance Yard.

Table 5.7. Mesa Verde Segment, Chapin Mesa Area, Newly Discovered and Reevaluated Cultural Resources

Site Number	Elevation	Cultural Affiliation	Site Type	Site Function
5MV3899*	2137 (7010)	Pueblo II	Kiln	Ceramic Firing
5MV3942*	2165 (7100)	Prehistoric/ Historic	Check Dams	Water Control
5MV3945*	2116 (6940)	Pueblo II	Kiln	Ceramic Firing
5MV3966	2152 (7060)	Pueblo II	Kiln	Ceramic Firing
5MV3967	2149 (7050)	Pueblo II	Kiln	Ceramic Firing
5MV3969	2137 (7010)	Pueblo II	Kiln	Ceramic Firing
5MV3970	2134 (7000)	Anasazi	Hearth	Food Processing
5MV3971	2149 (7050)	Anasazi	Pit Feature	Indeterminate
5MV3972	2134 (7000)	Pueblo II	Kiln	Ceramic Firing
5MV3973	2137 (7010	Pueblo II	Kiln	Ceramic Firing
5MV3978	2189 (7180)	Basketmaker III	Burial (Interment)	1 Individual
5MV3982	2146 (7040)	Pueblo II	Kiln	Ceramic Firing
5MV3984	2122 (6960)	Basketmaker III / Pueblo I	Isolated Find	Projectile Point
5MV3987	2111 (6925)	Anasazi	Hearth	Food Processing
Total New = 11				
Total Reevaluated = 3				

Note: * = sites that were previously recorded but affected by the waterline project.

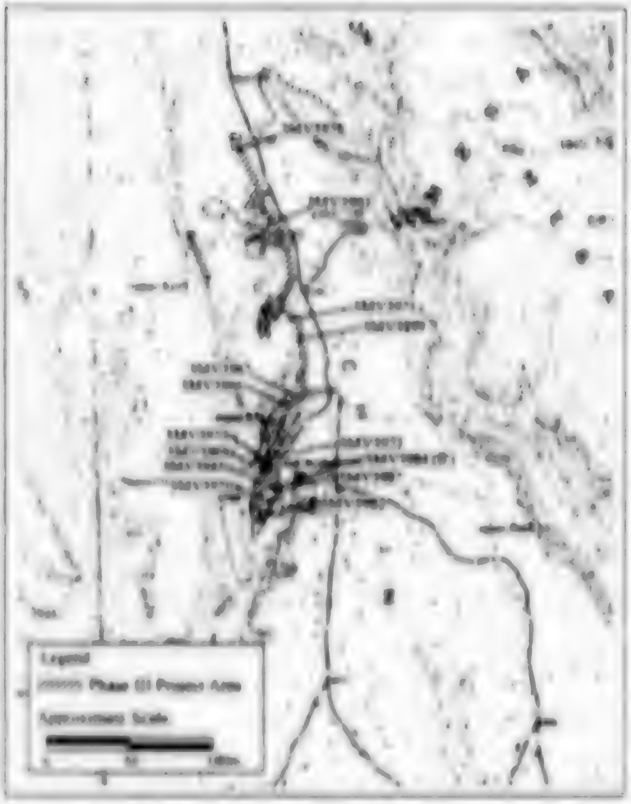


Figure 5.19. Mesa Verde Segment, Chapin Mesa Area, newly discovered and reevaluated sites.

Description of Archeological Sites Found as a Result of Mesa Verde Waterline Replacement Project Phase III in the Park Entrance Area

Site 5MV3977, Historic Mallet Homestead, Description

Site 5MV3977, the Mallet Site, consisted of the remains of an historic period farm/ranch/homestead of the late 1870s-1950s located to the northeast of the present overflow parking lot north of the Park entrance kiosks (Figure 5.20). Site 5MV3977 was considered eligible of the National Register primarily in the context of ranching and farming and thematically as early twentieth century and Depression Era settlement in the Colorado Plateau. Twelve surface features were recorded at this site over and area 100 m N-S by 100 m E-W. It was avoided during construction of the Mesa Verde Waterline.

Feature 1 was a dugout with a vertical post on the western end. Judging from the isolation, the post appeared to be the remains of a utility pole. The dugout depression was 9 m E-W by 3 m N-S and 1 m in depth. The depression was filled with historic refuse: paint, coffee, solder-hole milk cans, and other unknown solder-hole cans, a three-piece ring mold clear glass bottle base with no marks, two rectangular clear glass bottle bases 1 ½" by 2 3/4" with no makers mark (possible medicine bottles), a cabin shaped log cabin syrup can, tobacco tins, an oval press lid for a tin "Rawleigh's TRADEMARK REG" 3 1/4" by 2 1/8", zinc/tin canning jar lids with milk-glass canning jar liners, rubber boots, and white china fragments.

Feature 2 was a circular depression 3 m in diameter at a depth of 3 m. The feature was approximately 5 m northeast of Feature 1. The depression was probably a cistern.

Feature 3 was a square depression, 3 m N-S by 3 m E-W and 50 cm in depth. It was approximately 5 m northeast of Feature 2. The feature had a milled wooden box in the bottom of the depression. It had a milled square post with milled lumber fragments surrounding it and might have been a spring house.

Between Features 2 and 3, and north of Feature 3 were sparse historic refuse scatter including: crockery fragments with cream glaze exterior and interior, white china fragments including one with a yellow rose and green leaves applied decoration, a 6" diameter can lid cut with a lever can opener, a ½" mother-of-pearl button with a diamond shaped recess for the thread and two holes, a faceted round depression glass container, two tobacco tins, two key-opened coffee can lids, crockery with a brown glaze exterior and cream glaze interior, a 6" diameter crockery sewer pipe brown glazed exterior and interior.

Feature 4 was a cleared level area with an abundance of milled lumber fragments, possibly an outbuilding such as a bunkhouse.

Feature 5 was a squarish shallow depression 1 m in diameter and 20 cm deep, with milled lumber fragments around the exterior. This feature may represent a privy.

Feature 6, located east of Feature 4, was the remains of a pole corral. The juniper posts averaged 15 cm in diameter with an average length of 1.8 m. Approximately 30 posts remained. The feature included a tree cut to approximately 1.8 m above ground level and

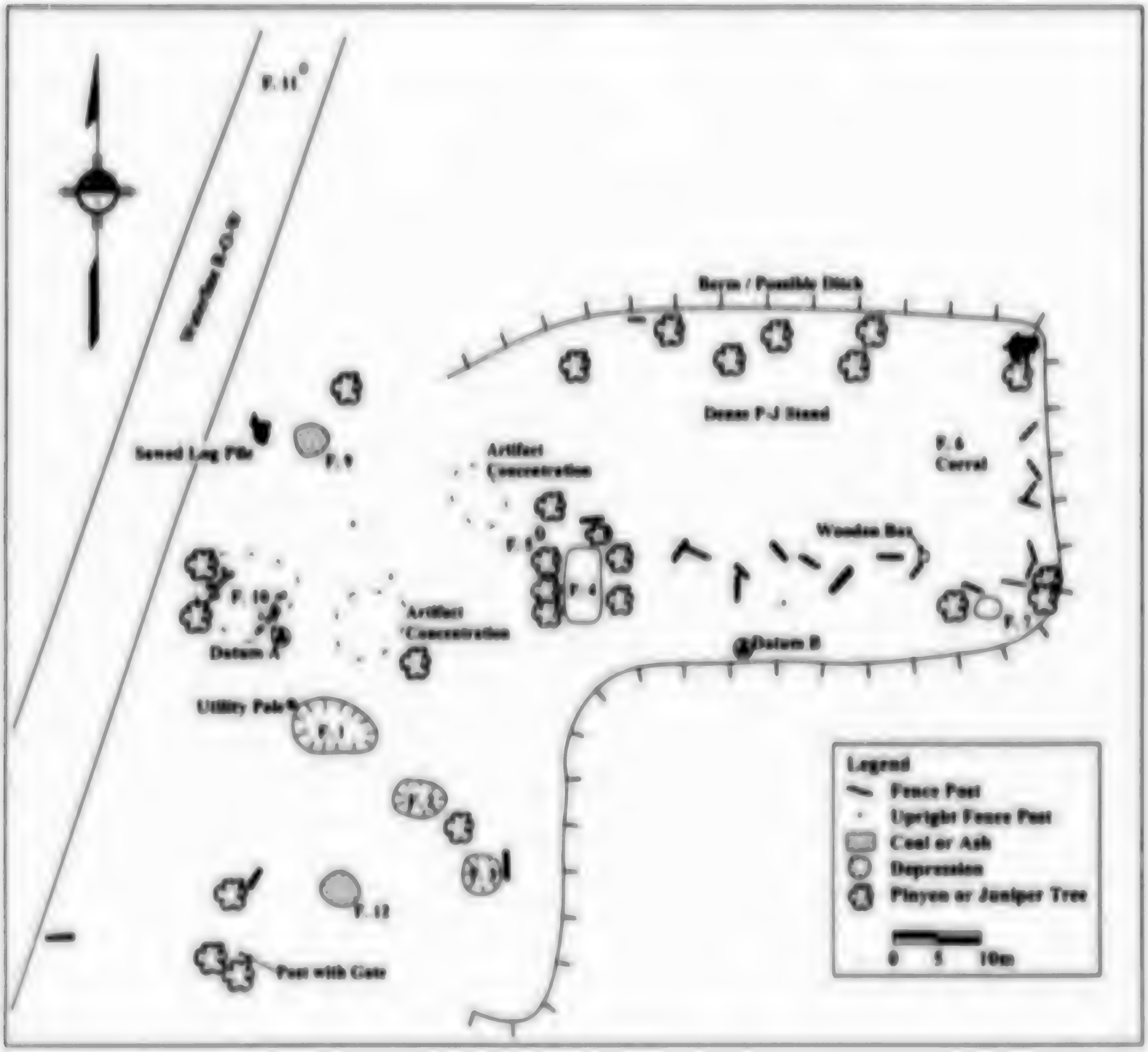


Figure 5.20. Site 5MV3977, the Mallet Homestead Site.

used as a gate post to the south-southwest of Feature 1. One "CALUMET 5 lbs. BAKING POWDER FULL WEIGHT ABSOLUTELY PURE" lid was observed in the corral area.

Feature 7 was a concentration of milled lumber fragments, possibly the remains of a small outbuilding. Only one baking powder lid was observed.

Feature 8 was a linear berm surrounding the site to the north and east of the site, with a slight depression to the interior of the site. The berm established the outer boundary of the site and was probably a ditch.

A scatter of historic refuse was visible between Feature 8 and 3. The trash scatter included a ½" mother-of-pearl button with a diamond shaped recess and two holes, aquamarine and cobalt blue glass fragments, and white china fragments.

Feature 9 was a coal dump and refuse scatter measuring 5 m N-S by 5 m E-W. The trash scatter included two rectangular milk glass cold cream containers with "POND" pressed in the short sides with raised letters, white china fragments including a fluted cup sherd, two milk glass canning jar liners "PLAIN LINER", one metal canning jar liner "MASON PAT...31 15", two clear glass ring seal canning jar necks, 12" diameter clear glass bottle, milled lumber fragments with manufactured wire nails, brown bottle glass, a tobacco tin that reads "...O Cigarette Tobacco... Than The Best...oky... Leaf Tobacco... ned In Natural... Nature's Way Mild And Mellow... Tobacco Co", an amethyst bottle base "MFG CO...NTED CHICAGO ILL.", an amethyst glass applied neck stoppered-top bottle neck, a metal canning lid container "Economy Jar Kerr Glass MFG CO", two brown glass crown-capped long-neck beer bottle necks, aquamarine flat glass, aquamarine rectangular octagonal bottle base 1 ½" by 3/4" with manufacturing mark "I" (medicine bottle), an oval cocoa press tin lid, a lever can opener opened 6" diameter can lid, a 4" diameter clear glass ring-sealed canning jar neck (not screw-top), crockery fragments glazed brown exterior and cream interior, white china fragment with five petal pink flower with green leaves applique, an amethyst jar neck for a ring-sealed canning jar (not screw), coffee cans opened by a rolling edge can opener, and 1/2 lb. coffee cans key opened.

Feature 10 was the remains of the main house. The sandstone foundation consisted of two parallel rows of unshaped sandstone blocks that averaged 30 cm in diameter. The rows were about 6 m in length and approximately 5 m apart.

Feature 11 was a concentration of cut posts and milled lumber.

Feature 12 was a concentration of coal residue about 4 m in diameter.

In June 1992, Park Ranger Naturalist Marilyn Colyer and volunteer Pat Oppelt conducted an oral history interview with Tom Stevenson, about 5MV3977 (Mallet Homestead). The site was also commonly known as the Hallar Camp and the Wattle Homestead. Stevenson, a farmer and rancher from Mancos, Colorado, was familiar with the historic families and this area as a resident for the last 70 years. Tom was accompanied to the site, and he examined the remains, and offered his ideas about the site. The house was about 20 by 30 ft, gray clapboard, and two stories tall. The house was moved to the meadow north of Point Lookout Station but later burned in a forest fire. Just east of the house foundation was the remains of a yard fence. The 30 ft tall juniper post with a threaded insulator peg was part of the Park's phone line. The phone line remnant was just a small section of the Knife Edge Phone System that ran through the site in the 1920s. The large sandstone blocks located south of the site and north of the parking lot show chiseled grooves. Tom thought these were being shaped for the Park's road culvert headings during the CCC era. Tom also discussed a Navajo road camp, he remembered as a young man, but could not recall the specific year. This camp consisted of four to six forked stick hogans just outside of the Park's west boundary line. The structures were made of logs, juniper bark, and thrown-on dirt. The people camped there for several summers. The Navajo men worked on the Mesa Verde road on the west side of Park Point.

5MV3980, Late Archaic/Basketmaker III Projectile Point

Site 5MV3980 was an isolated find. The projectile point was found on the top of a north-south trending ridge under an existing power line, within the power line and existing waterline right-of-way. The area was disturbed by blading operations. The projectile point was manufactured from a light gray quartzite (Morrison quartzite). The artifact is related to possibly Late Archaic/Basketmaker II period. The ridgeline where the projectile point was found provided a commanding view of the smaller drainage systems and meadows within the western portion of the Park entrance providing a favorable view for hunters of large and small game migrating from one major drainage area to the other (Figure 5.21). Isolated Finds are not considered eligible for the National Register.

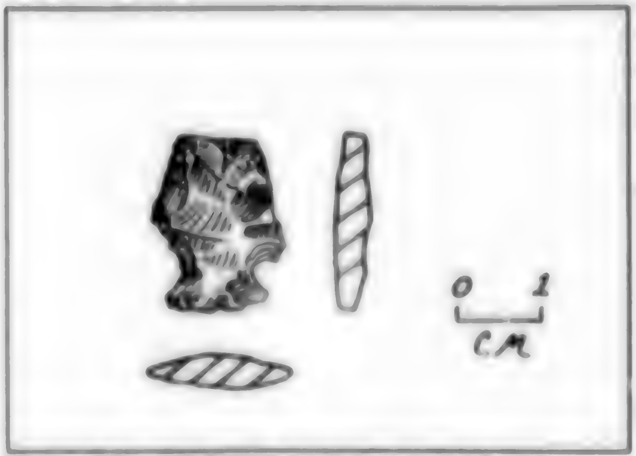


Figure 5.21. 5MV3980, isolated projectile point.

Description of Archeological Sites Found as a Result of the Mesa Verde Waterline Project Phase III in the Morefield Campground Area

5MV3975, Mancos Gray Ceramic Sherd

Site 5MV3975 was an isolated Mancos Gray ceramic sherd was found during trenching activities just west of the Morefield Campground Water Storage Tank (300,000 gallon tank) on the access road. Isolated finds are not considered eligible for the National Register.

5MV3976, Lithic and Ceramic Concentration

Site 5MV3976 consisted of a concentration of lithics and, ceramics found during trenching activities. The artifacts included 10 corrugated body sherds, a Mancos Corrugated sherd, 3 Mancos Black-on-white sherds, a McElmo Black-on-white sherd, 6 whiteware sherds, 2 pieces of Morrison Chert flaked lithic debitage, one piece of silicified siltstone flaked lithic debitage and one mano fragment. The artifact concentration was found on the southern edge of an existing access road constructed in the late 1960s. The artifacts were found in the upper 10 cm level within the trench and scattered over a very large area outside of the trench on the southern slope of the access road. No subsurface materials were observed below the upper 10 cm to base of trench, which was approximately 1.5 m deep.

The concentration of artifacts at Site 5MV3976 is not eligible for the National Register because the artifacts may be related to the excavations of Site 5MV1088, located were the present water tank resides. It is possible that the artifacts were mixed up in the construction fill during the late 1960s construction of the water tank and the access road.

Description of Archeological Sites Found as a Result of the Mesa Verde Waterline Replacement Project Phase III on Chapin Mesa

Fifteen archeological sites were discovered during monitoring of the Chapin Mesa Distribution System construction. Twelve of these sites were excavated or mitigated and are discussed in separate chapters: kiln sites 5MV3899, 5MV3967, 5MV3966, 5MV3972, 5MV3969, 5MV3945, 5MV3982; hearth sites 5MV3987, 5MV3970; a bell shaped pit feature, 5MV3971; an historic pit feature, 5MV3973; a burial 5MV3978, and prehistoric and historic check dams, 5MV3942. 5MV3984 was avoided during construction and is discussed here.

5MV3984

Site 5MV3984 was an isolated find consisting of a gray quartzite serrated corner-notched projectile point (Figure 5.22). The projectile point was found west of the Park's library within the waterline right-of-way. Isolated finds are not considered eligible for the National Register.

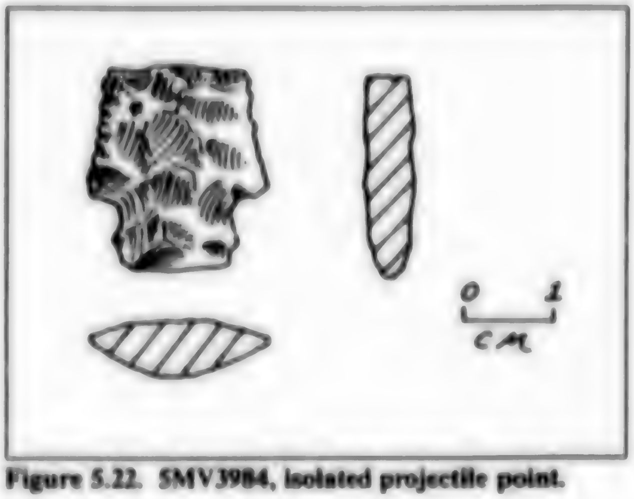


Figure 5.22. 5MV3984, isolated projectile point.

Historic Sites on Chapin Mesa

In addition to the archeological sites which were found along the pipeline route, Mesa Verde Waterline Replacement Project Phase III construction affected almost every building on the lower portion of Chapin Mesa. No site forms existed for the historic building areas which the waterline construction affected, then again site numbers were assigned but the forms were never completed. Site forms were completed and results are reported in the chapter on Mesa Verde Segment Testing and Excavation and the Historic chapter: 5MT9790 Mesa Verde Administrative District; 5MV3938, Historic District E.C.W., Utility Area; 5MV3939 Historic District NP-5C; 5MV3941, Historic District CCC Mesa Verde Campground; 5MV3990 Historic District, CCC Maintenance Yard; 5MV3991, Historic District CCC Utility Camp;

5MV3992, Historic District Navajo Hogan; 5MV3909, Water Catchment System head of Spruce Canyon; 5MV3940, CCC Camp NP-6C; 5MV3962, 1920s Spruce Tree Maintenance Yard; 5MV3963, the Deep Water Well; 5MV3964, Chapin Mesa Water Catchment System; 5MV3965, Spring Water Storage; 5MV3989, the Million Gallon Tank;

Discussion of Settlement Patterns and Land Use Within Mesa Verde National Park

The archeological sites found during the Mesa Verde Waterline Replacement Project Phase III within Mesa Verde National Park add information to our understanding of prehistoric and historic settlement patterns. Although the data from surrounding sites are in some cases incomplete, a general picture of these patterns through time is apparent.

There have been three previous studies of prehistoric settlement distribution within the Park (Hayes 1964; Rohn 1977; Smith 1987). The discussion of the Mesa Verde Waterline Replacement Project survey data and their relation to the cultural resources in Mesa Verde National Park will be presented in terms of the four areas affected by the Mesa Verde Waterline Replacement Project Phase III: Park Entrance, Morefield Campground, Navajo Hill-Far View, and Chapin Mesa. The Pecos Classification System will be used and site types discussed in terms of their physical characteristics in broad terms due to the inconsistencies in the survey data through time.

Park Entrance Area Settlement Pattern

Research associated with the Mesa Verde Waterline Replacement Project Phase III has added to our understanding of the settlement patterns in the Park Entrance Area. The Archaic/Basketmaker II projectile point (5MV3980), represents evidence of prehistoric hunting activities on the divide between the Mancos and McElmo drainage systems from as early as 1000 B.C.-A.D. 450. The Mallet Homestead (5MV3977), represents historic use of the Park area during the 1870s and early 1900s. With the evidence from previous research, it is clear that the Park Entrance Area was used prehistorically from Archaic through Pueblo II times for hunting and gathering and for habitation. Historically the land use changed from private homesteaders to National Park development, preservation, and administration.

The earliest documented sites in the Park Entrance area were three Archaic sites (5MV3902, 5MV3903 and 5MV3981) seasonal procurement camps (consisting basically of lithic debitage, lithic tools scrapers, gravers, core tools, projectile points, and one hand manos) and one isolated find (MEVE 205/50411 a possible Archaic chopper). Lithic material types were varied and some such as obsidian and chalcedony were not locally available. Two of the three Archaic sites (5MV3902 and 5MV3903) had possible hearths. The location of these sites indicates that nomadic hunter and gatherers found the Park Entrance area suitable to procure and process plant and animal resources found along the ridges and knolls that protrude along a topographic "divide" between the Mancos Valley and the Montezuma Valley. Although the Park Entrance area was marginal in terms of a long term occupation, seasonal use and camps of the nomadic groups were found.

Historic sites in the Park Entrance Area document the changes in land use from homesteading (Mallet Homestead 5MV3977), to construction work by Navajo employees (3 sweat lodges) to establishment of the National Park entrance area with Historic Residence #41 and associated facilities. Residence #41 completed in 1931, is an example of the Modified Pueblo Revival architecture. This residence is located west of the entrance to the Park and east of the Water Treatment Facility. Residence #41 is architecturally and historically significant in the areas of Politics/Government and Community Planning and Development.

The issue of development has played a prominent role in park affairs since Jessie L. Nusbaum became Superintendent in 1921. At the time, Nusbaum implemented his plan to move the Park headquarters from the nearby town of Mancos into the Park itself. Although most of the headquarters facilities were constructed in the park's Spruce Tree Camp on Chapin Mesa, the decision to build the Entrance Residence in a separate location related to Nusbaum's interest in operating the Park from within Park boundaries. The Entrance Residence provided a dwelling place for the person who staffed the nearby park entrance booth (Noble 1993: Section 8 and 1).

The historic entrance booth no longer exists, but the walkway that led to the booth is present. The walkway, consisting of unshaped sandstone slabs, begins at the front door entrance of Residence #41 and heads east to the Park's boundary fence and disappears under the present highway. Immediately adjacent to Residence #41 are two Park entrance historic signs. The two signs were probably constructed in 1938 by the CCC when they were remodeling Residence #41. Approximately 46 m (150 ft) to the south of Residence #41 are the remains of the Park's Entrance Outhouse (5MV3933). The Entrance Outhouse was constructed in 1932 and was used until approximately 1971 when the structure was dismantled and filled. To the west of 5MV3933, approximately 10 m (32 ft) is the 1956 Park Entrance Trash Dump (5MV3934).

Morefield Campground Area Settlement Pattern

The archeological sites found during the Mesa Verde Waterline Replacement Project Phase III in the Morefield Campground Area reflect the intense Pueblo II occupation of the area. Sites 5MV3975 and 5MV3976 contained artifacts related to the Late Pueblo II-Early Pueblo III as did 5MV1088 which was excavated, backfilled and partially removed in 1965. Pueblo III occupation was sparse in the Morefield Campground Area with abandonment of the area by prehistoric populations by A.D. 1200. Historic use of the Morefield Campground Area was indicated by a sweat lodge used by road construction workers and by Prater Reservoir, an early attempt to store water for the Park.

The majority of the sites recorded in the Morefield Campground and vicinity were occupied during the Pueblo II period (A.D. 900-1100) (Figure 5.23). The Pueblo II sites were mainly habitation sites and were located at the head of Morefield Canyon surrounded by the three large mesa tops (Prater Ridge, Point Lookout Ridge, and the East Rim) along the North and East Escarpment. Two sites were located on top of Prater Ridge to the southwest and three sites are located on the ridge of the East Rim. While five were located on east facing benches overlooking the Mancos Valley. Two sites were located on the slope of Lone Cone, with another concentration around Kiva Point. The rest were located in the valley floor. Most of these habitation sites were "L-shaped" rubble mounds ranging from small (1 to 4 room with or without kiva depression) to large (up to 17 rooms and two kivas). During the Pueblo II period the sites appeared to aggregate toward the head of the canyon. Approximately 3.2 km south in Morefield Canyon, Smith reported an intense Pueblo II community utilizing Morefield Canyon and the ridge and ridge slopes (Smith 1987:71-73). Sporadic Pueblo II sites are located between the two areas throughout the canyon. Morefield Canyon must have been a good location to sustain a large population during the Pueblo II time period.

During the Pueblo III period (A.D. 1100-1300) there was a decline of the intense aggregation of Pueblo II sites at the head of Morefield Canyon. Five sites have been assigned Pueblo II-Pueblo III with only one Pueblo III cliff storage room reported for this area. The movement appears to shift to the ridge slopes and ridge tops while the canyon itself is sparsely inhabited. This pattern is the same 3.2 km south in Morefield Canyon (Smith 1987:75-77), where there area few habitation sites during early Pueblo III . There appears to be an abandonment process of the entire eastern portion Mesa Verde from School Section Canyon east to the Mancos River (Smith 1987: 75-77).

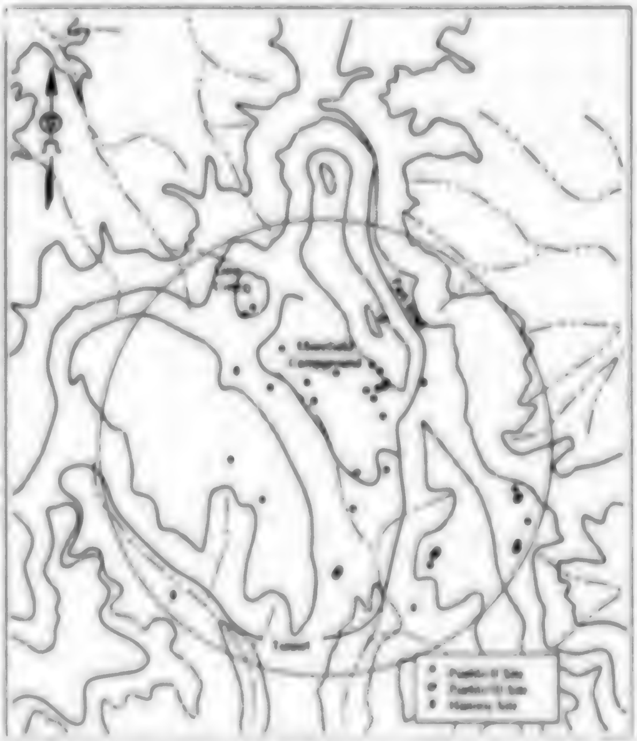


Figure 5.23. Distribution of known prehistoric and historic sites within 1.6 km of the Morefield Campground Area of the project.

Historic sites in the Morefield Canyon Area relate to early Park development. A Navajo sweat lodge on the Point Lookout Ridge was used during Nusbaum's superintendency. The site relates to the "day labor" when Nusbaum hired Navajo workers to build the Park roads. The other historic site in Morefield Canyon was an historic earthen dam named "Prater Reservoir," which relates to the continual struggle for adequate water in the Park.

Navajo Hill-Far View Area Settlement Pattern

Although no new site discoveries were made in the Navajo Hill-Far View area as a result of the Mesa Verde Waterline Replacement Project Phase III, information on the prehistoric settlement pattern can be derived from the 148 sites documented from Basketmaker III through Pueblo III. The historic sites relate to early Park development with Navajo sweat lodges, a corral, and historic water control features.

Two sites in the Navajo Hill-Far View contained a Basketmaker III (A.D. 450-750) component. One of these sites was located at the head and west side of West Fork Little Soda Canyon and the other located on a large bench between the confluence of the West Fork Little Soda Canyon and the East Fork Little Soda Canyon. The closest Basketmaker III community was the Plum Tree I settlement, 1.6 km south of Far View Ruin Group (Rohn 1977:271).

In the Navajo Hill-Farview Area Pueblo I period (A.D. 750-900) sites were located on the east side of Chapin Mesa in the canyons slopes and benches. Two were located at the head of the West Fork Little Soda Canyon; while two sites were located on the bench near the confluence of West Fork and East Fork Little Soda Canyons. The fourth Pueblo I site was located in Soda Canyon.

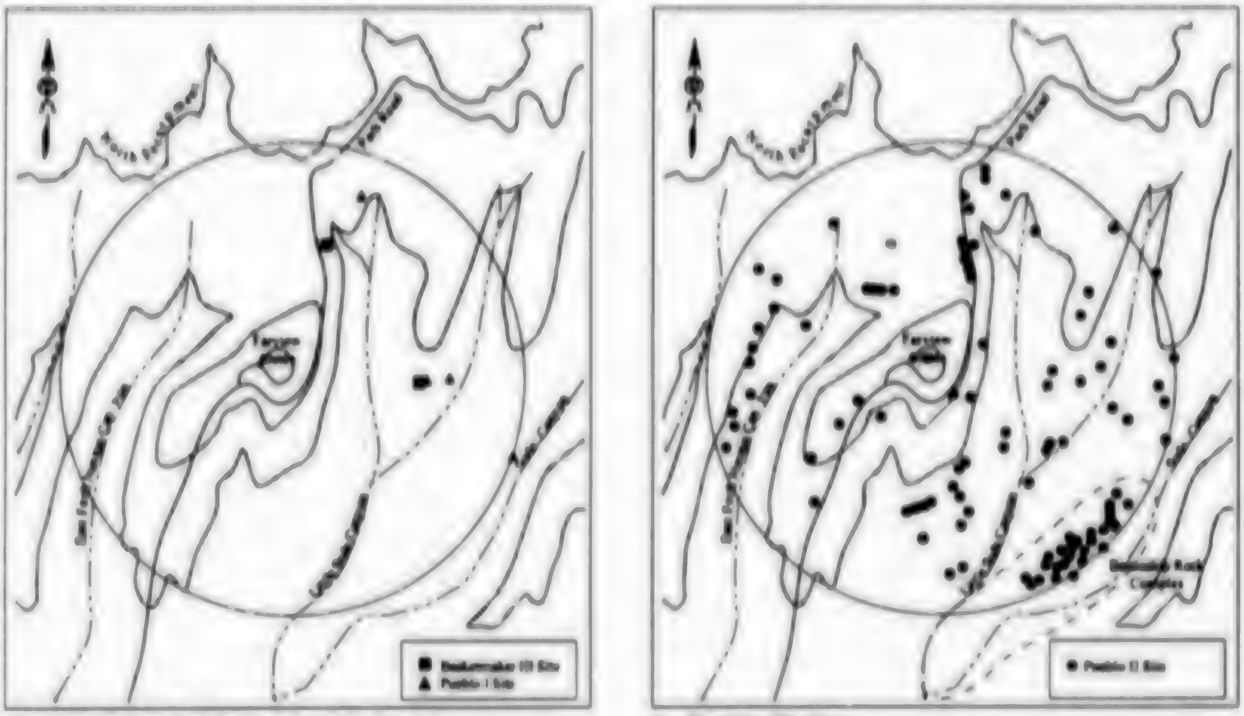
Within the 1.6 km radius of the Navajo Hill-Far View area, 100 Pueblo II (A.D. 900-1100) sites have been documented. Two sites indicated that there was continuous occupation from Pueblo I-Pueblo II, 61 sites were assigned to the Pueblo II and 37 sites fell into the Pueblo II-Pueblo III period. There was a series of sites located on Navajo Mesa and at the head of East Fork Navajo Canyon and a small cluster of sites along the Park highway north of Navajo Hill proper at the head of West Fork Little Soda Canyon. Another cluster was located south of the Visitor Center on the canyon slopes and moving up the drainage along the benches near the confluence of the West Fork and East Fork Little Soda Canyon. To the southeast of the project area between Little Soda Canyon and Soda Canyon was a Pueblo II community called the Battleship Rock Complex. The area was covered with multicomponent and multiple large complex structures covering every available parcel of land, a situation typical of the Pueblo II time period in the Park.

During the Pueblo III period (A.D. 1100-1300) in the Navajo Hill-Far View area there was a significant reduction in population as well as a movement mainly into the alcoves and utilization of the talus slopes, even though the mesa tops were sporadically occupied. The population for the Pueblo III period was reduced to half of the existing population from the previous period. Fifty-two Pueblo III sites were found within a 1.6 km radius of the Navajo Hill-Far View project area. The majority of the sites (37 out of the 52) of this Pueblo II-Pueblo III time period ranged from small structures to multicomponent and complex sites with possible continuous occupation. Only one cliff dwelling was reported in this area, site 5MV3742 "Four Window House" consisting of 8 rooms.

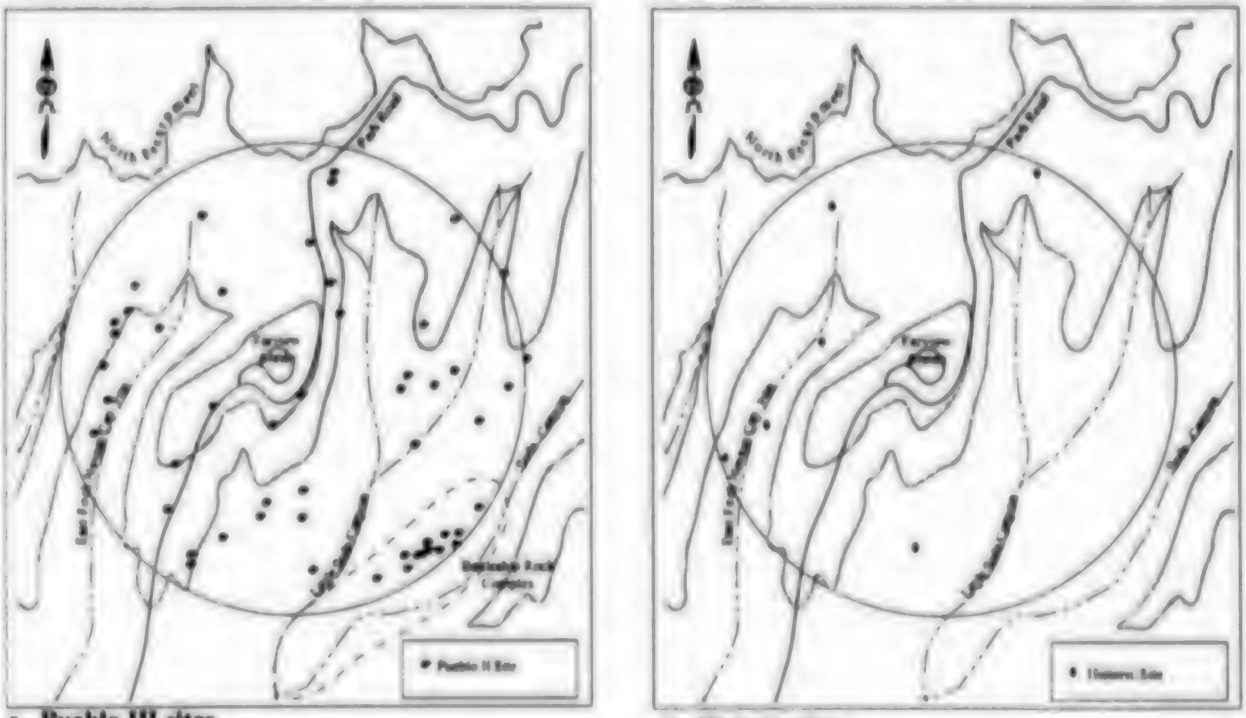
Chapin Mesa Prehistoric Settlement Pattern

The 11 archaeological sites found on Chapin Mesa as a result of the Mesa Verde Waterline Replacement Project phase III enhanced our understanding of prehistoric settlement patterns and land use. The discovery of the six sites (5MV3966, 5MV3967, 5MV3969, 5MV3972, 5MV3973, 5MV3982) containing prehistoric pottery firing kilns provided a significant opportunity for understanding the technology of Anasazi pottery production and the location of kilns in relation to habitation sites. The Chapin Mesa area has a long history of human occupation from the early Anasazi Basketmaker populations through the abandonment of the mesas in Late Pueblo III; to the early explorers and homesteaders; to the various stages of Mesa Verde National Park's development.

Nine projectile points relating to the Late Archaic and Basketmaker II Periods (1000 B.C.-A.D. 450) have been found on Chapin Mesa (Hayes 1964, Rohn 1977, Smith 1987). These artifacts probably indicate that the land was used for hunting in that early time period.



a. Basketmaker III and Pueblo I sites. **b. Pueblo II sites.**



c. Pueblo III sites. **d. Historic sites.**

Figure 5.24. Distribution of prehistoric and historic archeological sites within a 1.6 km radius of the Navajo Hill-Farview area of the project.

The majority of Basketmaker III (A.D. 450-750) sites on Chapin Mesa were located toward the interior of the mesa and along ridgelines where the deep loess soil for farming was present. A few Basketmaker III sites were lightly scattered throughout Spruce Mesa (Rohn 1977). On Chapin Mesa in the vicinity of the Million Gallon Tank, there were two Basketmaker III settlements (Rohn 1977). The Basketmaker III interment (5MV3978) discovered during the Mesa Verde Waterline Replacement Project was located south and west of those settlements. The gray quartzite serrated corner-notched projectile point (5MV3984) found in the waterline right-of-way further indicates prehistoric use for hunting during this time period.

There was a definite population expansion from Basketmaker III to Pueblo I in the Chapin Mesa area. These Pueblo I sites (A.D. 750-900) were basically located on the interior of the mesa and the ridgelines. The location of the Pueblo I habitation sites appeared to cluster more tightly together in some areas. Farming and long term habitations are indicated. Within the waterline project area on Chapin Mesa there were six Pueblo I settlements (Rohn 1977).

The Pueblo II period (A.D. 900-1100) in the Chapin Mesa area was one of great expansion of the Anasazi farming population. The Pueblo II sites were still distributed on the interior of the mesa along the numerous ridgelines on Chapin Mesa. The sites appeared to be more clustered in the southern end of the Park where the mesa top is broader perhaps for more intensified farming. The ridgelines in the upper portion of the project area are more constricted. Along Spruce Mesa to the west, the sites were lightly scattered on the mesa top. Six Early Pueblo II settlements were located on Chapin Mesa (Rohn 1977): Mummy Lake I, Sun Temple Ridge I, Site 299 and three unnamed site groups. The eight sites with Pueblo II prehistoric pottery firing kilns (5MV3899, 5MV3945, 5MV3966, 5MV3967, 5MV3969, 5MV3972, 5MV3973, and 5MV3982) were probably related to these or other Pueblo II communities. The major concentration of kiln sites was in the Museum Loop Road area.

Pueblo III (A.D. 1100-1300) sites on Chapin Mesa were scattered along the mesa tops with intense utilization of the alcoves where numerous (cliff dwellings) sites have been documented. This period shows a shift in the location of the sites from the utilization of the mesa tops towards the edges of the mesa and into the alcoves and the talus slopes (Rohn 1977).

Refining our Understanding of the Prehistoric Settlement Pattern in Mesa Verde National Park

The Mesa Verde Waterline Replacement Project, Phase III just happened to be located in four areas of Mesa Verde National Park ranging from low to high site density and representing human occupation from prehistoric times to historic times. The overall impressions of the project vary with location: from the Park Entrance, to Morefield Campground, to the upper Chapin Mesa area (Navajo Hill-Far View), to the lower end of Chapin Mesa. The data we have on settlement distribution show an overall picture of the changing Anasazi occupation over time. The three surveys that were conducted by Hayes (1964), Rohn (1977) and Smith (1987) created the basic background data into which the information from the sites discovered and evaluated on the Mesa Verde Waterline Replacement Project fit.

The discovery of Archaic and Basketmaker II procurement sites in the Park Entrance area was a significant contribution to our understanding of prehistory. These type of sites are probably also present under the Pueblo III structures in the alcove sites. Future studies into these sites are warranted.

The Anasazi Culture from Basketmaker III through Pueblo III settlement distribution needs to be intensively studied in Park locations other than Wetherill Mesa and Chapin Mesa. The Wetherill Mesa and Chapin Mesa sites need to be reevaluated in light of new recordation methods, new ceramic and tool typology, new site attribute types, and site function. Taking the University of Colorado's survey data base and completing the survey of the entire Park would show site distributions in those areas for all time periods of Anasazi Culture. The apparent movement of populations from the eastern portion of the Park to the west portion of the Park needs further study. Data from excavation may show why the eastern side of the Park was abandoned by late Pueblo III times (Smith 1987).

Studies are needed on how the early Basketmaker III inhabitants utilized water and if in fact they also created reservoirs, terraces, and check dams to control water. The control of water should be studied throughout all periods of Anasazi Culture and how the reservoirs, ditches, check dams, terraces, and peck-basins functioned as a whole on each mesa.

One of the other questions to be considered is how the community clusters located at the heads of most of the major drainages on the North Rim relate to the communities in the Montezuma Valley at the base of the North Escarpment. And it is hard to imagine that there is absolutely no evidence of ancestral *Nooche* and *Dineh* within the Park. It is very possible that as soon as the surface attribute signatures of these sites have been identified they may be found within the Park boundaries.

Summary of the Mesa Verde Waterline Replacement Project Cultural Resource Data Base

During the construction phase of the Mesa Verde Waterline Replacement Project Phase III a total of 47 sites was discovered and recorded over a noncontiguous 43 ha survey area and along the 63 km pipeline within the Mesa Verde Waterline Replacement Project area. The cultural resources ranged from the Late Archaic period through the Anasazi (Ancestral Pueblo) period through the Euro-American Historic period.

It appears that in the Mancos Segment the settlement pattern was one of prehistoric procurement sites in the uplands and historic homesteads.

In the Montezuma Valley Segment there was sparse occupation by Archaic and Basketmaker II populations with an increase in site density by Basketmaker III-Pueblo II. A perceived Pueblo II expansion may be related more to survey coverage than actual number of sites. It appears that known Pueblo III sites were confined to the base of the north escarpment of Mesa Verde. Historic sites included homesteads and trails through the valley and over the north escarpment to Mesa Verde.

In Mesa Verde National Park, new discoveries of Archaic and Basketmaker II procurement sites in the Park Entrance area deepen our knowledge of prehistory. Basketmaker III sites are located toward the interior of the mesa and along the ridgelines where deep soil is present. Population expansion is evident in Pueblo I times with locations in the same good farming areas. There is an even greater expansion of population evident in the Pueblo II time period with sites tending to be more clustered in the southern end of the Park where the mesa top is broader. Prehistoric pottery firing kilns of the Pueblo II time period were also found on the mesa top. Pueblo II sites also cluster in an around Morefield Campground. Pueblo III sites reflect a locational shift in settlement pattern from the mesa tops to the alcoves, talus slopes and mesa edges. Historic sites in the Park reflect not only Park development and construction using contract labor but also early homesteading in the Park area.

CHAPTER 6

MANCOS VALLEY SEGMENT TESTING AND EXCAVATION: SITES 5MT10969, 5MT4035, 5MT11731, 5MT11732, 5MT11733

Joel M. Brisbin

Introduction

This chapter deals primarily with the archeological testing and mitigation of five sites in the Mancos Valley Segment of the Mesa Verde Waterline Project. Two historic sites and three prehistoric sites were investigated in the Upper Mancos Valley north of Chicken Creek: 5MT10969 (an historic homestead); 5MT4035 (the historic Rio Grande Southern narrow gauge railroad grade); 5MT11731, 5MT11732, and 5MT11733 (three prehistoric upland procurement camps) (Table 6.1).

Table 6.1. Sites Archeologically Tested in the Mancos Valley Segment

Site Number	Site Type	Cultural Affiliation
5MT4035	Narrow Gauge Railroad Grade	Euro-American
5MT10969	Habitation	Euro-American
5MT11731	Procurement Camp	Archaic/Anasazi
5MT11732	Procurement Camp	Archaic/Anasazi
5MT11733	Procurement Camp	Archaic/Anasazi

Mancos Valley Segment Physiographic Setting

The physiographic setting of the Mancos Valley Segment of the Waterline Replacement Project is characterized by southwest trending ridges and hillocks separated by small shallow valleys. The underlying stratum is predominantly Mancos Shale which overlies massive beds of Dakota Sandstone. The Mancos Shale is the parent material for most of the soils in this area. The Greenhorn Member of the Mancos Shale Formation outcrops in the Mancos Segment and is characterized by beds of limestone (Griffitts 1990:44). Chicken Creek to the southeast and Mud Creek to the northwest are the only two permanent streams. They drain to the southwest where they join the Mancos River near the western boundary of the Mancos Valley (Figure 6.1).

5MT10969: Historic Homestead

The historic homestead habitation site, 5MT10969, was most likely occupied starting in the mid 1930s and was abandoned at some point prior to 1949. It was located on land administered by the U.S. Bureau of Land Management in Township 35 North, Range 13 West, in Section 20 at 2177 m (7140 ft) elevation. Of the identifiable features at the site, only one (Structure 1) was excavated because it extended into the waterline right-of-way and had the potential to yield information on the Colorado historic themes of Ranching; Farming; and; Water and Irrigation (Husband 1984). Evidence for the functional interpretation of the site came from the 12 site features, the excavation of Structure 1, the analysis of the 331 artifacts recovered, the eight animal bones found, and information from a personal interview with the adjacent landowner, Robert Bement. The chronological dates for site occupation were based on analysis of the historic artifacts, tree-ring analysis of three main timbers from Structure 1, and information from the personal interview.

Site Features

Those portions of site 5MT10969 which were, for the most part, the remains of structures were designated as archeological features (Figure 6.2). They included burned and unburned remains of buildings, a trash midden, and a deep shaft water well. Although all of these features were not excavated, their relationships to the excavated structure were important to the analysis of this site.

Feature 1 appeared to be the burned remains of a small framed outbuilding. The debris consisted of roofing tin, window glass, and four piles of unshaped sandstone blocks in a rectangular alignment which covered an area 14 by 7.1 m (46 by 23.3 ft). Based on the positions of the sandstone piers, the structure itself was probably no larger than 3 by 5 m (10 by 16 ft) with a floor space of 15 m^2 (160 square ft).

Feature 2 will be discussed under its subsequent designation as Structure 1.

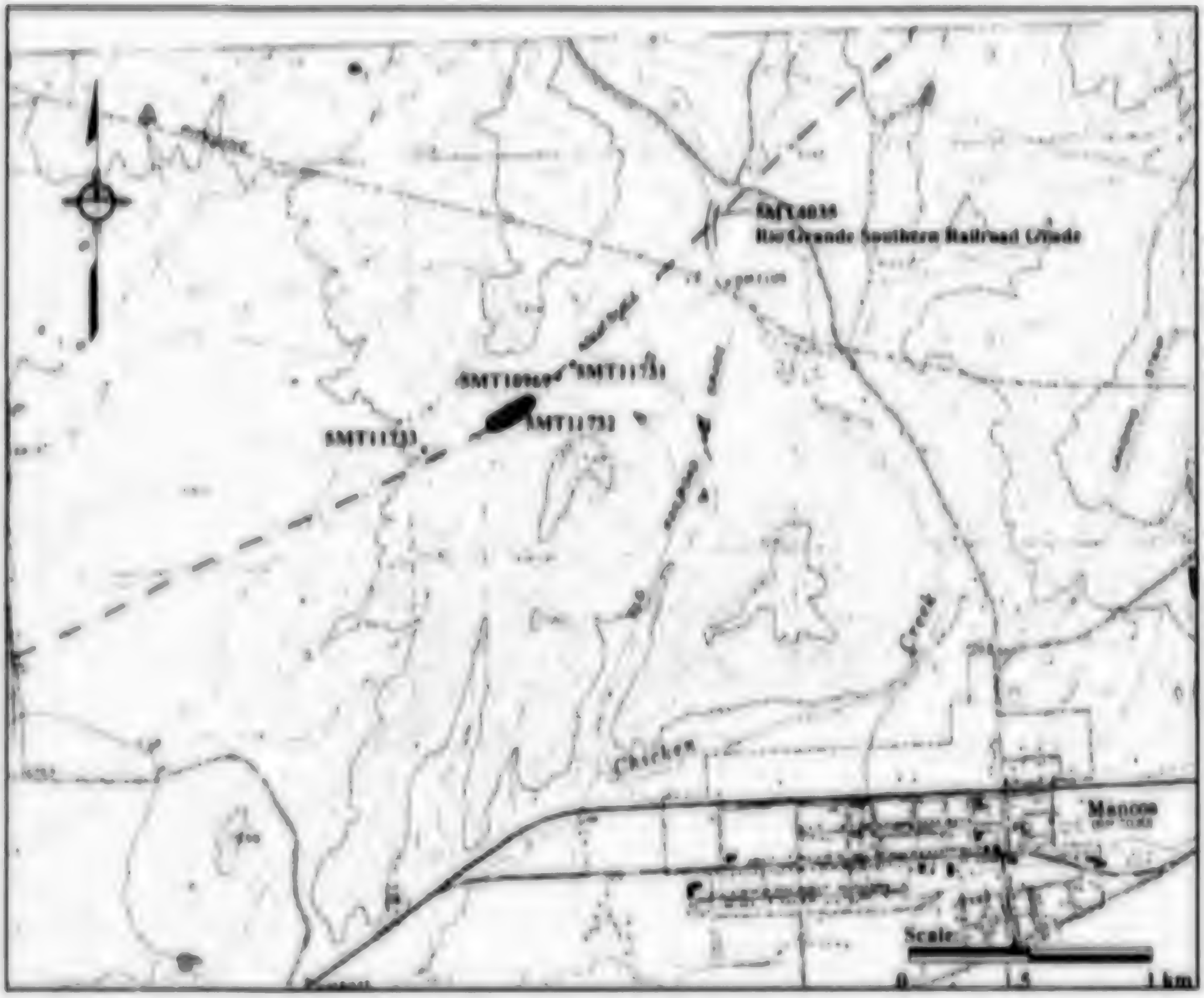


Figure 6.1. Sites archeologically tested in the Mancos Valley Segment.

Feature 3 was a linear, man-made depression 14 m long by 7 m wide (46 ft long by 23 ft wide).

Feature 4 was a rectangular area of disturbed soils and sagebrush with 4 upright posts, which may have been the main residence unit. The feature measured 13 m north-south by 10 m east-west (43 by 33 ft) and contained a high density surface scatter of sheet metal, milled lumber, scrap metal, and wire nails. There was a dense scatter of domestic trash along the northern margins of the feature area.

Feature 5 consisted of the two upright posts west of Feature 4. The northern post was a section of a small tree that was simply trimmed in situ. The southern post was a composite of two small poles wired together and set into the ground 1 m (3.3 ft) to the south. The posts formed an entry way 1 m wide (3.3 ft), which, judging from a cluster of milled lumber in the immediate area, was at one time equipped with a gate.

Feature 6 was a rectangular scatter of fired earth fragments with associated nine burned pole uprights. These posts partially defined the limits of the west wall as well as the north and east walls. There was a considerable scatter of corrugated sheet metal intermixed within the burned earth fragments particularly along the north wall. The disturbed area was approximately 8.5 m north-south by 6 m east-west (28 by 20 ft). The actual structure size, based on the burned wall posts, was approximately 4 m by 6 m (13 by 20 ft) giving an overall floor area of 24 m^2 (260 square ft).

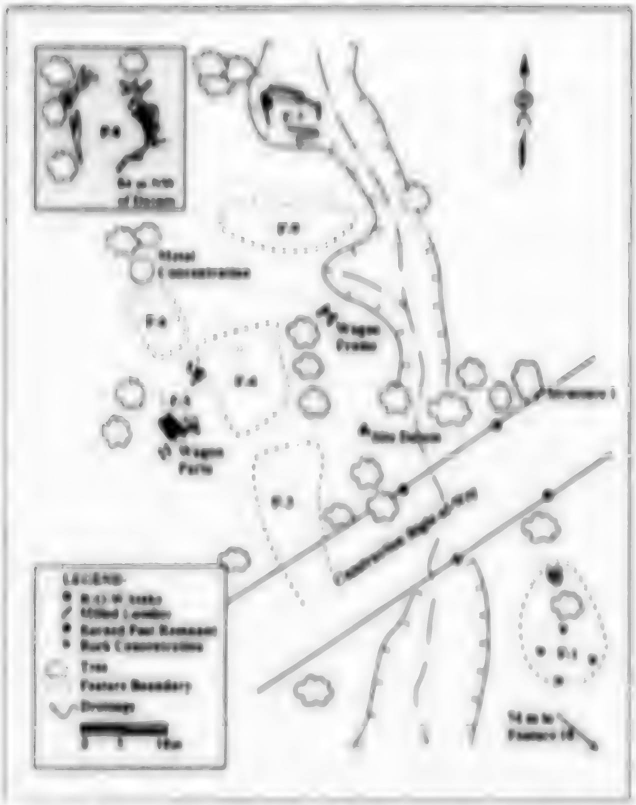


Figure 6.2. 5MT10969 site plan view showing features.

Feature 7 was located on the west bank of an ephemeral stream which runs along the east side of the site. The feature was completely enclosed, on all but the east face, by walls composed of large and small logs erected above native earth walls of a dugout pit. There were no remains across the east face opening to indicate how the structure was closed or even if it was closed with a door. The upper wall poles and logs were notched with an axe so they could be set in courses, and these overlapping joints were reinforced with 15 cm (6 in) spikes. Charring on some of the larger logs may indicate that the structure burned, but it appeared more likely that the wall material was scorched prior to its use in the structure.

Feature 8 was the remains of a brush and pole enclosure located 84 m (276 ft) to the northwest of the site center. It measured 8 m by 7 m (26 by 23 ft) and may have had an opening on the south side facing Feature 4.

Feature 9 was a rather considerable trash midden located to the north and east of Features 4 and 6 and along the west bank of the arroyo east of the site. This feature measured 15 m by 5 m (49 by 16 ft) and contained a wide variety of broken household items such as fragments of clear glass, crockery, porcelain, metal, leather, and wooden items.

Feature 10 was a simple shaft lined on the sides with planks to hold back the subsoil. It was located 79 m (259 ft) southeast of the main occupation site near the toe of the slope on which the site sits. The subsurface portion of this feature was visible to a depth of 1.7 m (5.6 ft). Silting prevented the actual depth from being observed. The shaft opening was 1.55 m by 1.4 m (5 by 4.6 ft), and the highest point of the existing superstructure stood 90 cm (35 in) above the present ground surface (Figure 6.3).

Structure 1 Excavation Strategy and Methods

Structure 1 (initially designated Feature 2) was the only feature at Site 5MT10969 which was excavated. The historic structure extended into the right-of-way and would have been adversely affected by construction activities. Archeological information derived from the excavation had the potential to yield information on the historic human occupation including use of natural resources and subsistence strategies. The structure also related to the Colorado historic themes of Ranching and Farming, so the archaeological research focused on determining the function and date of the historic building (Husband 1984:10.4).

Prior to excavation, Structure 1 appeared as a depressed area along the north edge of the right-of-way, with construction timbers visible on the surface at the north end. These timbers slanted down and disappeared into a matrix within the depression indicating there was some depth to the structure. The structural remains were initially tested to determine the exact lateral extent particularly southward into the main construction zone.

The initial test consisted of a north-south test trench 1 m (3.28 ft) wide across the apparent center of the depression. This trench was excavated following natural stratigraphic levels until the floor (Surface 1) was reached. Cultural material was collected by stratum and items on or within 5 cm (2 in) of the floor were more specifically point-located and plotted on the floor assemblage map. Provenience description numbers were assigned to each stratum and to the floor surface during the excavation of this initial test trench. These

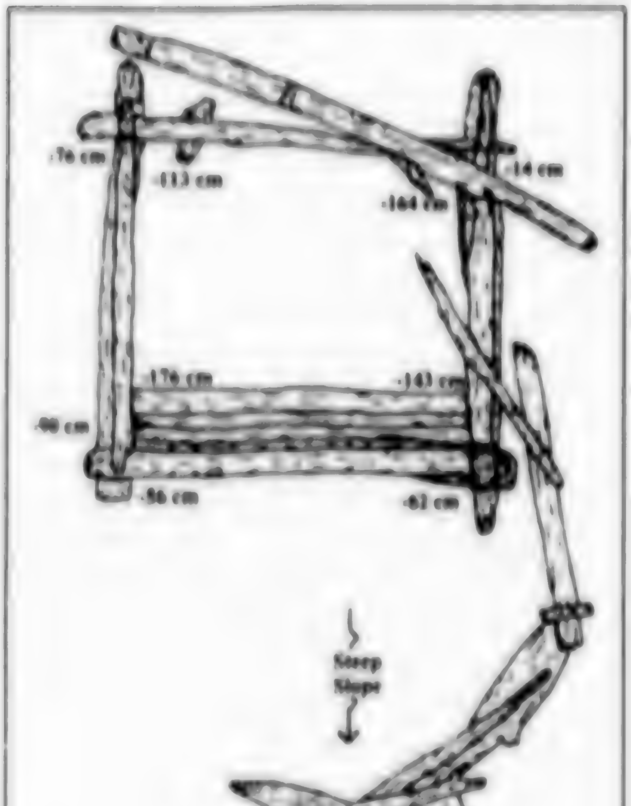


Figure 6.3. Feature 10, Site 5MT10969, water well shaft.

provenience numbers were retained throughout the rest of the excavation when the decision was made to excavate the entire structure. Due to the extraordinary hardness of the matrix, which was derived from decomposed Mancos Shale, little screening was possible. By the time the initial test trench was completed, the north wall and the occupational surface had been defined. The test trench was extended to the east and west. Two maps were drafted. The first was used to record the fallen timbers, which had been used for the walls of this structure. The second map recorded all the floor artifacts as they were encountered. Additional maps of stratigraphic and architectural profiles were also produced. Tree-ring samples were taken from the wall and roof timbers.

The major stratigraphic levels of Structure 1 were the fill and the floor (Surface 1) (Figure 6.4). The fill of Structure 1 was subdivided into two strata. An arbitrary third stratum was added which consisted of the last 5 cm (2 in) of Stratum 2 where it contacted Surface 1. This 5 cm (2 in) was designated as floor fill, and any cultural material recovered in this level was point-located. Overall the fill in Structure 1 was a dense deposit of clay loam derived from the Mancos Shale parent material. Stratum 1 was deposited by alluvial action after the structure had been abandoned and the roof and sidewalls had collapsed into the structural pit. The contents of Stratum 2 differed from Stratum 1 only in the presence of structural timbers in Stratum 2.

Structure 1 Description

Structure 1 was rectilinear in plan view (Figure 6.5). The entry into this unit was through a doorway in the center of the south wall which was approximately 1 m (3 ft) in width. This entryway was near the existing ground level, while the remainder of the building had been cut into the hillside. The south wall on either side of the doorway was lightly constructed on a vertical post framework using milled lumber for the horizontal members to close the opening. Both the east and north walls, on the other hand, were constructed of massive timbers that had been roughly shaped with an ax and notched at the ends to overlap the logs below.

Although there was not much material remaining along the west wall, it looked as if the same construction technique was used as for the north and east walls. Most of the timber from the west wall was probably salvaged for use elsewhere at some time after the structure was abandoned. Window glass found at the site suggests that Structure 1 had two windows. In the east wall, there were no cutouts or notches in the heavy poles and timbers, and thus a window in that wall seems unlikely. Windows would have been more likely in the south wall since this orientation would maximize the illumination potential. The exterior dimensions of Structure 1 are presented in Table 6.2.

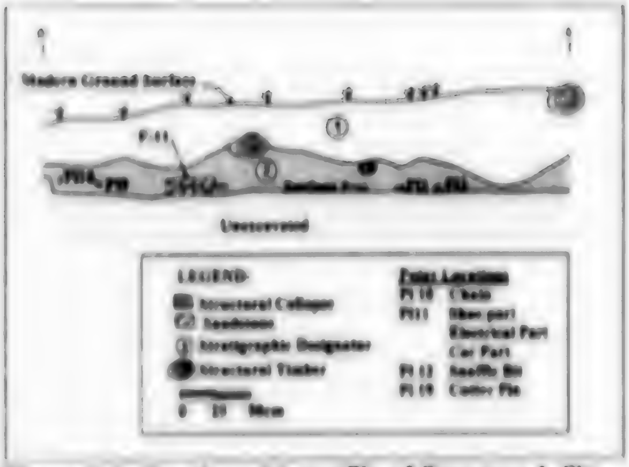


Figure 6.4. Stratigraphic profile of Structure 1, Site 5MT10969.

Table 6.2. Wall Dimensions of Structure 1, Site 5MT10969

Wall	Length	Height
North	2.9 m (10 ft)	6 m (2 ft)
West	3.0 m (10 ft)	68 m (2.2. ft)
East	3.6 m (12 ft)	5 m (1.6 ft)
South	2.8 m (9 ft)	35 m (1.1 ft)

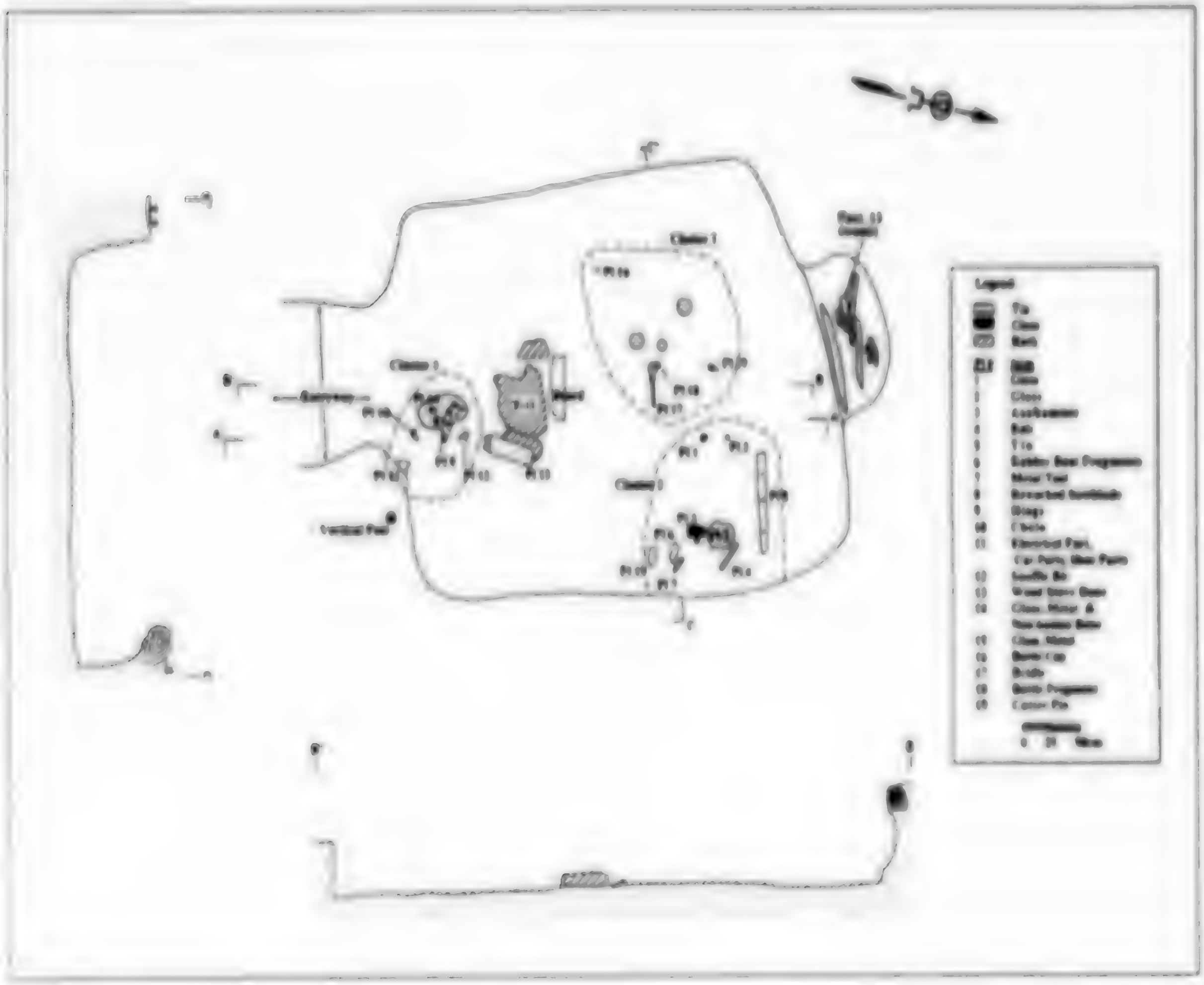


Figure 6.5. Structure 1, Site 5MT10969, architectural profiles and plan view with point located artifacts and features.

The Roof and Interior of Structure 1

The roof of Structure 1 was constructed of 2x4 rafters which were suspended from the west and east walls and apparently rested on a central ridge beam running north-south. The closing material appeared to be 1x2 and 1x4 milled lumber that was placed perpendicular to the rafters. There seems to have been space left between the individual boards which would indicate that they were not the final covering on the roof. There was no evidence in the fill of tar paper (black felt) or tin. This may mean that dirt from the pit excavation was used on the roof, which even today is a common way to cover semisubterranean structures. Figure 6.6 shows a schematic representation of the way the exterior of structure may have appeared while in use.

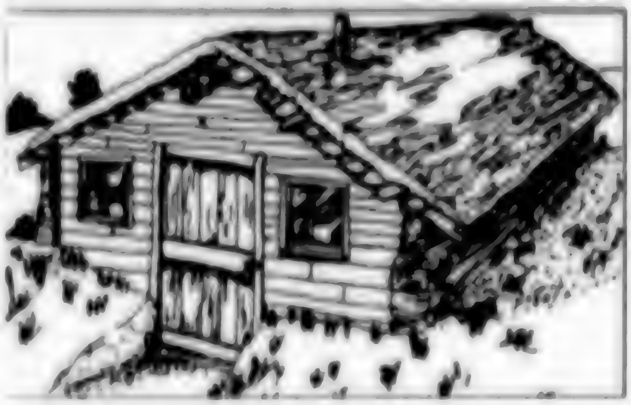


Figure 6.6. Schematic rendering of Structure 1, Site 5MT10969 (J. Brisbin).

The interior of Structure 1 had only two constructed features designated Features 11 and 13. Feature 11 (F-11) consisted of two large slabs of tabular sandstone lying flat on the floor in the center of the southern half of the room. The slabs may have provided basal support for a wood burning stove, judging by the presence of a door embossed with Rock Island Stove Co. which was lying on top of one of the slabs. There were no other stove parts in the entire structure. The second feature, Feature 13 (F-13), was rather unusual. It was a vault cut into the central portion of the north wall 13 cm (5 in) above Surface 1. It was 1.15 m (3.7 ft) wide across the face, 40 cm (16 in) deep, and approximately 50 cm (20 in) high. The fill of this vault was consistent with the rest of Structure 1, with some wooden roof member fragments in its lower fill.

Surface 1, The Floor of Structure 1

The floor surface in the structure was native soil compacted by use. East to west the floor was level except near the walls where it curved up slightly to meet the base of the vertical pit walls. North to south, the slope of the floor dropped so that it was 5 cm (2 in) lower at the doorway at the north end (Figure 6.5). There were 19 discrete locations of artifacts lying on Surface 1 of Structure 1.

Historic Artifacts Recovered From 5MT10969

The entire assemblage of 331 artifacts recovered from site 5MT10969 was analyzed by Jonathan C. Horn of Alpine Archaeological Consultants, Inc., Montrose, Colorado (Horn 1994). Historic artifacts are generally divided into categories which identify their place in the functioning of the human occupation of a particular site (Horn 1994:1). The artifacts from 5MT10969 represented nine of these categories: Structures, Building Furnishings, Personal Artifacts, Natural Resource Tools and Equipment, Science and Technology Tools and Equipment, Transportation, Recreational Artifacts, Packages and Containers, and Unclassifiable Artifacts.

Artifacts Associated with Structures

Artifacts within the Structures category are defined as "artifacts originally created to define space for human activities or to be used as components of space defining artifacts" (Blackaby and Greeno 1988:III-1). All of the 38 artifacts from Structure 1 in this category were building components: 29 pieces of window glass from at least two windows; a metal shaft to which a door knob could be attached; a 5.4 cm (2 1/8-in) diameter cast iron door handle escutcheon plate; four fragments of an iron sheet metal mortise door knob lock; and three stamped iron sheet metal hinges. There was a single butt hinge, a T-hinge, and one tapered strap hinge. These building component artifacts suggest the presence of a rather plain building with at least two windows and one door.

Building Furnishings

Two pieces of an alarm clock, identified functionally as a household accessory, were the only artifacts found within Structure 1 in the Building Furnishings category. The near absence of artifacts from the Building Furnishings category indicated a sparsely furnished or unfurnished structure (Horn 1994:7-8).

Personal Artifacts

Footware, outerware, and an article of personal timekeeping were recovered from Structure 1 in the Personal Artifacts category. Twenty-five fragments from at least two leather shoes or boots were found on the floor of Structure 1. Clothing fasteners that were found included eight shirt buttons and one button from work clothes. An oval-shaped, knurled, brass crown (winding knob) from a pocket watch was one of many items found together in the north central portion of the structure.

Natural Resource Tools and Equipment

The Natural Resource Tools and Equipment category is made up of artifacts "created to manage, oversee, capture, harvest, or collect resources and to transfer or modify particular materials, both raw and processed" (Blackaby and Greeno 1988:III-5). Artifacts were found representing uses of natural resources in the categories of Animal Husbandry, Food Processing, Food Service, Forestry, Metalworking, and Woodworking.

Fence staples, a broken horse bit, three harness buckles, a harness snap, and five pieces of harness represent human activities associated with Animal Husbandry.

However, the widest variety of artifacts recovered from most historical sites falls within the Food Group, which is subdivided here into Food Processing and Food Service. Four Food Processing items were recovered from the floor of Structure 1: a cast iron wood stove door lying directly on top of a sandstone slab which could have formed a base beneath the stove; two sanitary can fragments and a zinc canning jar lid with a white, milk glass lid liner; and a fragment of a purple, "Economy" fruit jar base. Food service artifacts were represented by liquor and beer bottle fragments. Nineteen pieces of a Hiram Walker & Sons, Inc. amber liquor bottle and its brown plastic screw cap were found on the floor of Structure 1 (PL. 16).

One artifact possibly associated with the Forestry category of Natural Resource Tools and Equipment was what appears to be a portion of a bucking saw blade with remnants of teeth on one side and a mounting rivet on the other. Three Metalworking artifacts were recovered from the floor of Structure 1: a cold chisel and two sharpening stones.

Artifacts associated with Woodworking included wire nails, wood screws, and a claw hatchet. Twenty-six wire nails recovered from the fill were found as individual items or still secured in pieces of roofing. The nails on the floor were generally found in clusters as if they had been stored in some form of container.

Science and Technology Tools and Equipment

Science and Technology Tools and Equipment are defined as "tools, equipment, and supplies used for the observation of natural phenomena or to apply knowledge gained from such observation" (Blackaby and Greeno 1988:III-11). Only two artifacts in this category were found: a white, plastic electrical plug prong cover plate, and a portion of a padlock which was recovered from the floor of Structure 1.

Transportation

Transportation artifacts are defined as artifacts "originally created to transport or distribute animate and inanimate things" (Blackaby and Greeno 1988:III-17). Artifacts found in this category all fall within the Land Transportation group: animal-powered, motorized, and accessory subgroups. A single, singletree bolt was recovered. This was a 64 cm (1/4-in) diameter bolt, 4.4 cm (1 3/4 in) long, with a 5 cm (2 in) by 1.6 cm (5/8 in) oval-shaped head. Singletrees were used for pulling wagons or other equipment with horses or mules. This artifact, along with the artifacts in the Animal Husbandry group, suggested some use of horses for transportation or labor at 5MT10969 (Horn 1994:13).

Seven artifacts were recovered from the floor of Structure 1 that indicate maintenance and use of automobiles. These were a radiator drain cock, two tire valve covers, portions of three tire chains, and a tire valve commonly used on wooden wheels with steel rims on 1910s and 1920s automobiles. All of the Land Transportion Accessory artifacts recovered appear to have originated from an automobile: a trim screw, an upholstery fastener, and a rubber door bumper. The automobile parts found on the floor of Structure 1 indicate minor maintenance or repair of wheels and interiors of 1910s or 1920s period vehicles (Horn 1994:14).

Recreational Artifacts

Recreational Artifacts are "artifacts originally created to be used as toys or to carry on the activities of sports, games, gambling, or public entertainment" (Blackaby and Greeno 1988:III-21). A single clear green glass marble 1.6 cm (5/8 in) in diameter was found in the roof fill stratum and was the only recreational artifact found.

Packages and Containers

The Packages and Containers category is made up of "artifacts originally created to be used for packing and shipping goods and commodities, and containers for which a precise function cannot be determined" (Chenhall 1978:52). Sixteen fragments of a clear bottle and 20 pieces of metal can fragments were found on or near the surface of Structure 1. The glass was from a round, screw top bottle with decorative ribbing.

Unclassifiable Artifacts

Unclassifiable Artifacts are artifacts that cannot be classified into one of the more specific categories because their function is not known, they are too fragmentary to be identified specifically, or they have multiple functions. Ten bolts were recovered from Structure 1. Most of these were found in a cluster of floor artifacts, giving the impression that they had been spilled from a single container. Two flat washers, one lock washer, a single hex nut, two cotter pins, two screw eyes, a 5 cm (2 in) long hanger screw, and 15 pieces of wire. Two pieces of a straight spout oiler and a steel canister wheel were found in Structure 1. An irregular-shaped, stamped steel, combination tool and a spring clip were also part of the floor assemblage.

Artifact Remnants included one purple glass, square rim fragment; forty-four metal fragments that could not be identified as to function; and seven pieces of rubberized material from a rubber overshoe made for a boot.

There were 16 artifacts of unknown function recovered from the floor of Structure 1. All of these metal items were associated with PL #14: an artifact cluster near the doorway which included glass, metal, and one piece of non-human (animal) bone. The animal bone was an indeterminate large mammal cervical vertebrae fragment. The 16 metal objects include an iron ring, a brass collar, a sheet metal cone, three metal sleeves, three iron brackets, a shaft or chuck, a shaft and collar, two lids, and a glass lens. The glass lens was an oval piece of flat glass (1 1/2 by 1 1/8 in) with a beveled edge. It may have been a glass cover for a brooch or locket (Horn 1994:17).

Faunal Assemblage From 5MT10969

There were 8 pieces of faunal bone recovered from Structure 1, seven from the roof fall stratum and one from the floor. There was one indeterminate large mammal cervical vertebrae fragment; one *Ovis aries* (sheep) right tibia; one *Ovis aries* rib; two indeterminate large mammal long bone diaphysis fragments; two *Bos taurus* (cow) rib fragments, and one indeterminate large mammal rib fragment. This small faunal assemblage consists of two domestic species (sheep and cow). One sheep tibia displays a saw cut at the middle diaphysis and displays evidence of extensive canid modification. The other large mammal, long bone diaphysis fragments also display evidence of canid modification. The bones suggest that at least one cow, and one domestic sheep were butchered and eaten by the residents of this homestead. The canid altered bone also indicates that the residents probably had one or more dogs, which acted as mobile garbage disposals (Rude 1994:7).

Functional Assessment of 5MT10969

Site 5MT10969 must have functioned as an historic homestead habitation site. There were 12 identifiable features, which appeared to be the remains of habitation and farm buildings. There were two small shed-like buildings (Feature 1 and Feature 6), one of which was of jacal construction (Feature 6). There appeared to have been a main residence (Feature 4), surrounded by a fence (Feature 5), with a driveway (Feature 3) approaching it from the south. North of the residence there was a fairly extensive trash midden (Feature 9) containing broken and discarded household goods.

Uphill and north of the house there was a brush and log corral (Feature 8), and 79 m to the southeast at the base of the hill was a well or cistern (Feature 10). There were two semisubterranean structures (Feature 2-Structure 1 and Feature 7) at this site, one of which was excavated as part of the mitigation work associated with Phase III of the Mesa Verde Waterline Replacement Project. Within the excavated Feature 2-Structure 1, two features were found (Feature 11 and Feature 13). Feature 11 consisted of two large slabs of sandstone which were probably base supports for a wood stove. Feature 13 was a vault storage area. This array of features was certainly related to a permanent habitation site where multiple activities took place relating to both routine household maintenance, ranch, and farm related activities.

Functional interpretation for most of the unexcavated features necessarily relied on inferences based on surficial evidence alone. Understanding the major features of the site helps to place Structure 1 into its overall archeological setting and provides a fuller picture of the human occupation of the site.

Feature 1, the southernmost outbuilding at the site was probably a small, tin-roofed building containing one or more windows. The sandstone piers indicated that it was desirable to have the floor elevated above the ground level, which suggested that there was a constructed wooden floor. This type of building would have served well as a tackroom/feed storage room, since the wooden floor would have served as a barrier against rodents.

Feature 3 from surface appearances was probably a driveway or parking area, since it was located directly south of Feature 4 which has been defined as the main house area.

Feature 4 was defined as the main house since the construction debris was located inside what appeared to be a fenced yard. The fence was inferred from the two gate posts (Feature 5) and the milled boards, probably from the gate, lying between the gate posts.

Feature 5 was the remains of a gate. The house (Feature 4) was probably surrounded by a fence.

Feature 6 was another small outbuilding located northwest of the main house, which had one or more windows and a tin roof. The earthen floor in this shed was probably compacted by use. This type of building may have served as a poultry coop, and if so may also have had some form of woven wire fence around it to protect the birds from predators. The building's proximity to the main house would have made the daily egg gathering chore more convenient. It could also have served as a storage shed or small guest house. The jacal construction mode was traditionally favored by Spanish American settlers. Adjacent landowner, Robert Bement stated that he was told by a neighbor, Jake Gonzales, that this homestead was inhabited during the depression era by a Spanish American family (Robert Bement, personal communication 1993).

Feature 7 was a dugout type of structure located on the eastern edge of the site. It was dug into the west bank of a north-south trending arroyo which defined the eastern limits of the site. The construction mode used on Feature 7 appeared to be identical with that of Structure 1. Ascertaining the function of this structure was problematical, because of its location on the edge of an arroyo which carries water at certain times of the year. Possibilities include root cellar, garage, or another workroom-storage shed like Structure 1. Perhaps during the occupation of the site the arroyo was not developed as deeply as it is now and periodic flooding was not a problem.

Feature 8 was the only evidence of a corral. It was a simple brush and pole corral with no vertical corner posts or other vertical posts in evidence. There was no evidence, such as set and trimmed corner posts, that a great deal of effort had been employed in constructing this corral. This type of makeshift corral was commonly built for expedient temporary use, such as doctoring, or could have served as a lambing pen in the spring. If this was indeed the only corral at the site, then livestock production was not a big part of this homestead operation.

Feature 9 was the household trash midden located at the point of a triangle between the main house (Feature 4) and the "chicken coop" (Feature 6). The midden extended eastward to the edge of the arroyo.

Feature 10 was the well or cistern located 79 m to the south of the house near the foot of the hill. Adjacent landowner, Robert Bement was told by a neighbor, Jake Gonzalez, that the family who lived on the site intentionally located the well in this area adjacent to the irrigation ditch. The ditch, which was constructed in the late 1800s, was the source of irrigation water for those farmers in the northwestern section of Mancos Valley. Mr. Gonzalez told Mr. Bement that the family dug the well next to the ditch so that the seepage from the ditch would be naturally filtered by the soil before entering the well.

All of these features, combined with Structure 1, create a picture of a self-contained, single family homestead characteristic of the depression era ca. A.D. 1929-1939 settlement on the Colorado Plateau.

Speculation was not necessary for Structure 1, which was excavated in its entirety. The items recovered from the floor of this structure could be classified as a nuts and bolts assemblage. Most of the items found were metal or a composite of leather and metal. The glass found was either broken window glass or the remains of liquor bottles. The metal items did not represent complete tool assemblages but instead a mismatched, hodgepodge of items likely to be found in any farm or ranch storage shed today. Useable items were seldom discarded as de facto refuse around a farm or ranch because there would eventually be a place to use them. Although it appeared that it was a fairly open room, this building apparently was used year round since it was outfitted with a wood burning stove. Portable items, such as a bench or table could have been removed without leaving discernible evidence. The lack of complete usable tools as well as the distribution of floor artifacts strongly suggested that prior to site abandonment, items of value were removed from this shed leaving only the unwanted residue recovered by the excavations. The artifacts were segregated into three distinct clusters. Two of these were found in the north half of the room and another much smaller group was found near the doorway at the south end of the room. These might have been sorting piles consisting of useable but unwanted items, which were deposited at the time of abandonment. A less likely possibility is that they had been stored on shelves in perishable containers, such as cardboard boxes which have now disintegrated. No other nonperishable containers, such as cans or jars, were found. The total lack of household items such as crockery, eating utensils, and home furnishings--coupled with the nuts and bolts assemblage--left little doubt that Structure 1 served as a utility shed where minor repair and maintenance of equipment took place.

Dating of 5MT10969

Which artifact types are found or not found at a site can help to determine when a site was actually occupied because some artifacts were not made before a particular date or were made for a short period of time. Artifacts found in Structure 1 at 5MT10969 which can be used as chronological markers were sanitary cans, bottles made in an automatic bottling machine, bottles with standard continuous thread closures, the molded plastic screw cap and embossing on the Hiram Walker liquor bottle, and wire nails.

Sanitary cans began being manufactured on a large scale in 1904 and by 1911 dominated the market replacing the earlier hole-in-cap type cans (Horn 1994: 21). The presence of sanitary cans and absence of hole-in-cap type cans indicates a post-1911 date for site occupation. The automatic bottling machine also began being used in 1904, revolutionizing the glass container industry (Miller and Sullivan 1984:83-96). Continuous thread closures were standardized in 1924 (Lief 1965:26-29). A post-1924 date was suggested by the presence of standard continuous thread closures on all glass bottles found and the absence of hand finished bottles.

One bottle fragment that may help establish when the site was abandoned was the fragment of the Hiram Walker bottle. This bottle was embossed with the legend "FEDERAL LAW FORBIDS SALE OR REUSE OF THIS BOTTLE." This warning was included on liquor bottles manufactured between 1933 and 1964. Also the molded plastic screw cap on this liquor bottle was of a type only manufactured in quantity starting in 1927 (Horn 1994: 20). Only wire nails were recovered from the site. Wire nails began to dominate the nail market in the 1890s and, by 1913, nearly 95% of the nails manufactured in the United States were wire (Horn 1994:19).

Tree-ring dating provides more information. The side wall timbers from Structure 1 were unburned and so well preserved that the samples could be taken with a chain saw. Three of the main timbers were sampled and sent to the tree-ring laboratory for analysis (Table 6.3).

Table 6.3. Tree-Ring Dates Frim Structure 1, 5MT10969

Species	Sample	Inner Date/ Outer Date	Comments
Juniper	1355	1863 ++vv	Log from East Wall
Juniper	1518	1920 vv	Log from East Wall
Juniper	1579	1934 +B	Log from East Wall

The tree-ring analyst concluded:

> Site 5MT10969, the historic utility shed, produced three dates. The noncutting date of 1863 ++vv probably represents a deadwood element incorporated into the structure long after the tree died of natural causes. Although CVM-1832 (sample 1 above) produced a non-cutting date at 1920vv, this log probably was cut in the middle 1930s when the structure apparently was built. CVM-1831 (sample 3 above) produced a + cutting date that indicates that this tree was felled and the shed built in the summer of 1934 or 1935 (Dean 1994).

Thus there seems little doubt that Structure 1, as an isolated unit, was built in 1934 or 1935 based on the tree-ring evidence.

Absolute beginning and abandonment dates for the occupation of this homestead are almost impossible to ascertain without written records. Unfortunately, our literature search through county records failed to find any listing or records of the inhabitants. The artifact material suggested that the site was probably not occupied prior to 1924 (because all glass vessels found had threaded finishes). The tree-ring dates, the Hiram Walker bottle and brown plastic screw cap, and two uncollected license plates lying on the site definitely established that the site was occupied in the early 1930s.

The best source for information about time of abandonment came from Mr. and Mrs. Robert Bement who have owned the adjacent property since 1949, when, the Bements say, the homestead was abandoned and had been for some time. Thus the time of occupation seems to be fairly well established between 1924 and 1949. Structure 1 was most probably built in the summer of 1934 or 1935.

Mr. Robert Bement purchased the land adjacent to 5MT10969 land in 1949, when he says the homesite was already abandoned; there was no standing architecture then. What appeared to be the main house (Feature 4) and one outbuilding (Feature 6) had burned, he said. These observations were verified by our initial recordation of the site in 1992. Mr. Bement was told about the site by a neighbor, Mr. Jake Gonzales, who said a Spanish American family had once lived there. The identity of this family may have been known by Mr. Gonzales, but he passed away in 1980 and none of his surviving family knows (Robert Bement, personal communication 1995).

Summary of Site 5MT10969

The remains of the historic homestead habitation, 5MT10969, included a main house surrounded by a fence, a driveway, a root cellar or storage shed, one small outbuilding roofed with tin, another small outbuilding possibly of jacal construction, a brush corral, a well, a trash midden, and a utility building for minor repairs and maintenance. Excavation of the utility building (Structure 1) resulted the recovery of materials used in inferring the site function and in dating the site. The historic artifacts from the site represented a wide variety of habitation activities relating to building furnishings, personal artifacts, natural resource tools and equipment, science and technology tools and equipment, transportation, recreational artifacts, and packages and containers. A single family could have occupied 5MT10969 first as early as 1924 when standard continuous thread closures became common on all glass bottles. Structure 1, the utility building, was built in the summer of 1934 or 1935 based on tree-ring dating of construction timbers. At some point between 1935 and 1949 the homestead habitation site was abandoned.

Site 5MT4035: Rio Grande Southern Narrow Gauge Railroad Grade

Site 5MT4035 was designated as that portion of the Rio Grande Southern Rail System found in Montezuma County, Colorado. This system is important within the Colorado Historical theme of Railroads because the railroad grade has "physical and locational integrity to make historic function and dimensions readily apparent" (Husband 1984:9.5). It is an important cul-

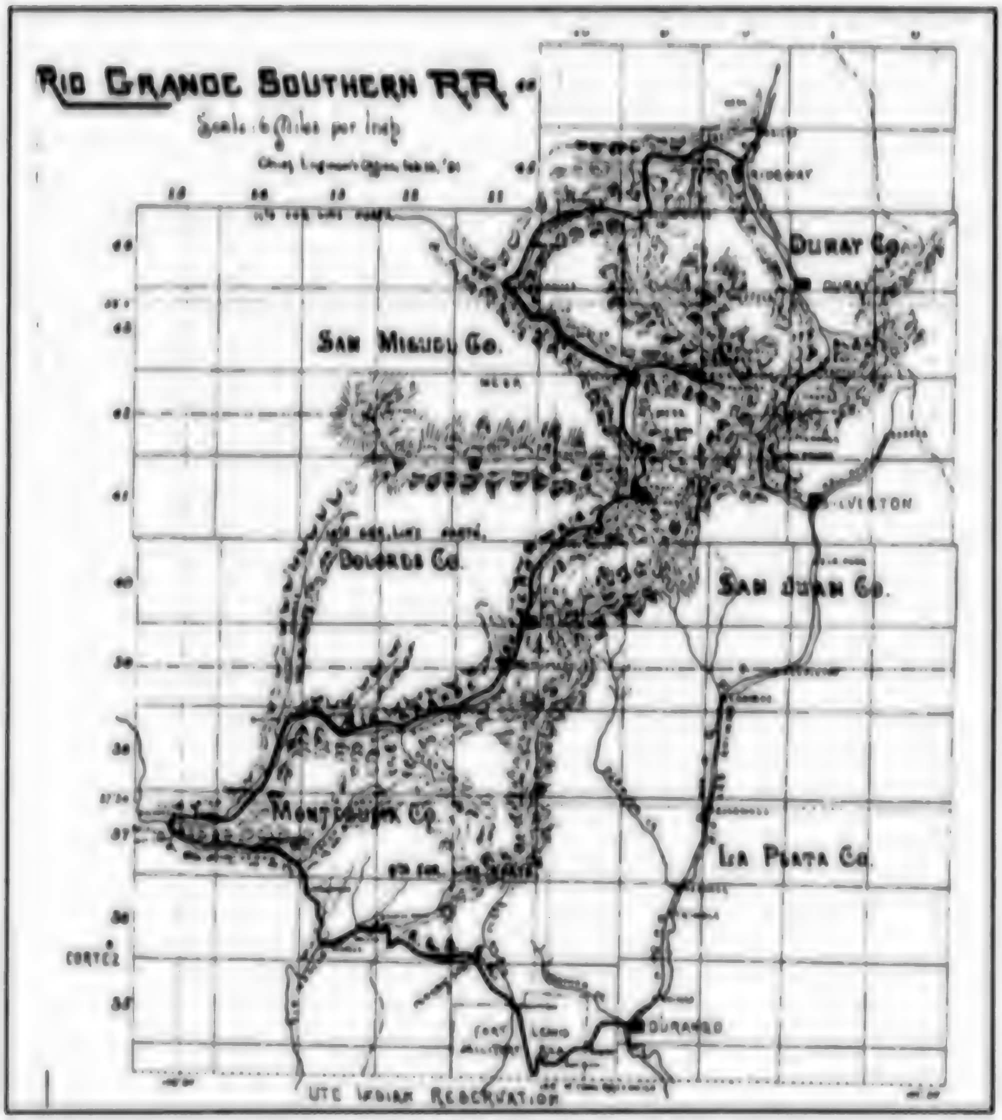


Figure 6.7. The route of the Rio Grande Southern Railroad in southwest Colorado, as depicted in the original survey map drawn in 1891 (Reprinted by permission, from Ferrel, Silver San Juan: The Rio Grande Southern Railroad p. 49, copyright 1973 by Pruett Publishing Co.).

tural resource type as an example of "...unique engineering features that represent the role Colorado rail designing played in national rail evolution..." (Husband 1984:9.4).

In A.D. 1889 a consortium was formed to build a narrow gauge railroad to connect Durango, Colorado, with what came to be known as Ridgway, Colorado. The purpose was to tap the lucrative profits from the booming extractive industries in the San Juan Mountains, primarily by shipping ore from the mining districts to the smelters and by hauling timber from the mountains to the mills.

The southern branch of the Rio Grande Southern ran west from Durango to Mancos, where it turned northwest towards Dolores. From there it ran northeast up over Lizard Head pass and Dallas Divide and then down to Ridgway (Figure 6.7). The segment between Mancos and Dolores paralleled Chicken Creek for a short distance (Ferrel 1973). The old narrow gauge was totally abandoned in 1951.

The Mesa Verde Waterline right-of-way bisects the old narrow gauge railroad bed near State Highway 184 in Township 36 North, Range 13 West in the northeast quarter of Section 20 at 2170 m (7120 feet) elevation. It was well known that the railroad once ran through this area and that the present landowner's driveway passed over part of the old bed.

Feature 1: Railroad Bed Construction

The intersection of the railroad bed and the pipeline trench was designated Feature 1 of Site 5MT4035. The pipeline excavation trench cut through the railroad bed at a right angle to clearly reveal the construction sequence. The stratigraphy was recorded to document the bedding techniques used in construction of the railroad. The railroad right-of-way appears in the cross section as a 25 m (82 feet) wide disturbed area plus approximately 1 additional meter (3.28 feet) that had since been cut away by a modern irrigation ditch (Figure 6.8). The 26 m (85 feet) railroad pre-bedding cut was flat on the bottom and sloped sharply up on the west (uphill) side. In engineering terms this is called a bench cut.

The cut was filled with a mixture of rocks and soil strong enough to form a solid base to support the weight of a fully loaded train. The soil was a gray, silty loam which had been thoroughly mixed with crushed limestone and shale. Thick beds of both the Greenhorn Limestone and Mancos Shale are abundant in the immediate area and were probably quarried and crushed on the spot. Two separate layers of dense clay were found towards the center of the rail bed, with the lower layer wider than the upper. The deeper clay layer was 4.5 m (15 feet) wide and slightly basin-shaped in cross section. This layer was 10 to 15 cm (4 to 6 inches) thick and was directly on top of the limestone and shale bed, 20 cm (8 inches) above the initial cut surface. There were 20 cm (8 inches) of crushed rock between the two clay layers. The uppermost clay layer was 10 to 15 cm (4 to 6 inches) thick and only 4 m (13 feet) wide. A final 20 cm (8 inch) layer of crushed rock and soil covered the width of the railroad bed up to grade and ready for ties and track.

Interpretation of The Railroad Grade Construction

The major railroad bed material of the crushed rock and soil formed a solid foundation for the wooden cross ties and the rails. With this design, the railroad bed could withstand the heavy use by trains and freight weighing many tons. The rails were set only .9 m (3 feet) apart on top of the ties. Thus the entire enterprise depended upon the integrity of the wooden cross ties. If they failed due to rot, then the whole system would go crashing down. The dense, impervious clay layers under the ties probably acted as a moisture barrier which halted any ground water from rising and damaging the ties through capillary action. Probably of more importance, the clay bands controlled the lat-

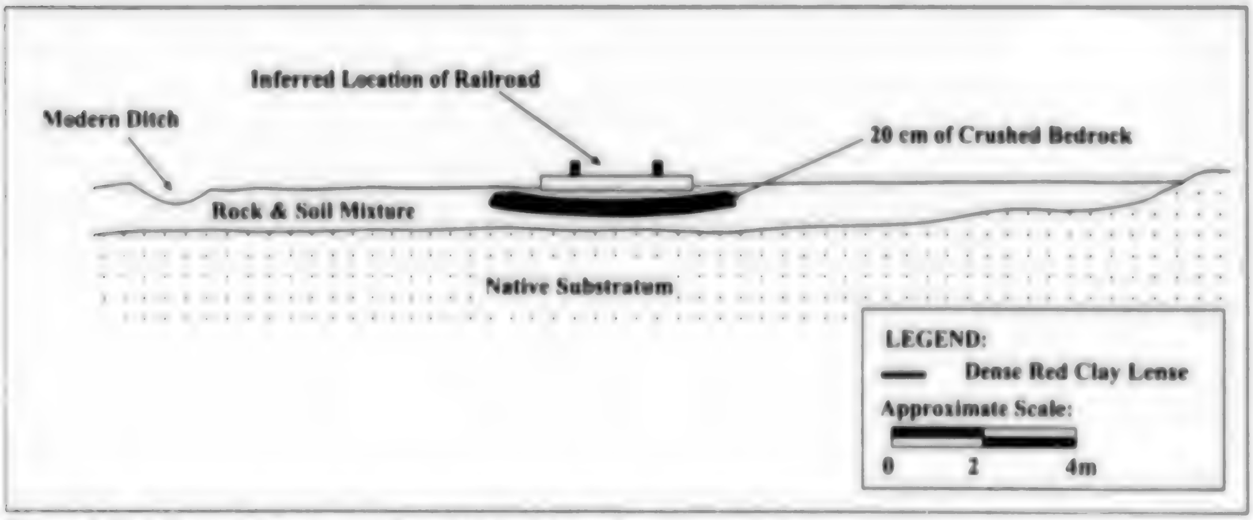


Figure 6.8. Schematic representation of railroad grade construction.

eral thrust caused by the train's weight. Without the clay layers, the heavy train could have displaced the crushed rock, which acted as the primary foundation for the railroad bed. The two, dense layers of clay below the ties would have acted as shock absorbers, fielding most if not all of the lateral pressure before the weight of the train could displace the crushed rock bedding material.

These construction principles are but a minor piece in the much larger historical picture of the significance of the Rio Grande Southern Narrow Gauge Railroad to the development of this remote southwestern corner of Colorado (O'Rourke 1980:95). There was probably an economic relationship between the Rio Grande Southern Railroad (5MT4035) and the historic homestead (5MT10969) previously described. As the crow flies, these two historic sites were less than 1.6 km (a mile) from one another, and they were used at the same time. The narrow gauge railroad offered a means to get agricultural products to distant markets not only for the residents of the homestead, but also for the families of the other widely scattered farmsteads and ranches in the Mancos Valley. The railroad also delivered goods previously unavailable to the pioneer families. This service certainly had a major impact in an area that only a short time before had been undeveloped wilderness.

The historic homestead (5MT10969) and the Rio Grande Southern Railroad Grade (5MT4035) represent the historic sites in the Mancos segment of the Mesa Verde Waterline Replacement Project which were tested archeologically. The excavations and subsequent analysis provided detailed information on the economy, adaptation, and social organization of the historic people of the Mesa Verde area.

Prehistoric Upland Procurement Camp Sites 5MT11731, 5MT11732 & 5MT11733

Three of the prehistoric sites recorded in the Mancos Segment of the Mesa Verde Waterline Replacement Project Phase III required testing and mitigation: 5MT11731, 5MT11732, and 5MT11733. Based on their surface characteristics, these three sites all appear to have been Seasonal Locus/Use Area Site Types that served the same function over a long temporal span, from the late Archaic through early Basketmaker II Period well into the Pueblo period. The tool assemblage from these sites was dominated by low input, expedient tools commonly associated with the processing of wild plant resources: mealing tools, such as unshaped, one-hand manos, and basin metates made from large cobbles or slabs. Utilized flakes also made up a large portion of the tool assemblage. In contrast, there were few high input, bifacially flaked tools such as knives, scrapers, and projectile points which are commonly associated with obtaining and processing wild faunal resources. Because of the characteristics of the tool assemblages from the three sites, they have been interpreted as prehistoric upland procurement camps with an emphasis on procuring floral resources rather than faunal.

5MT11731, 5MT11732, and 5MT11733 were spatially very close together about 2.5 km northwest of Mancos, Colorado on low saddles and slopes along a ridge line which separates the watersheds of Chicken Creek to the east and Mud Creek to the west (Figure 6.1). This physiographic location was a natural access point for persons wishing to follow Chicken Creek up into the higher elevations to the north and east. The landscape, in general, includes gentle southward trending slopes covered by pinyon and juniper trees interspersed with small, open, sagebrush-covered parks.

Archeological investigations at each of the sites followed a similar procedure. First, all surface artifacts were identified and flagged. These items were then point-located and collected. These data were used to create distribution maps for the sites so that any internal patterning could be readily recognized. In addition, both sites 5MT11731 and 5MT11732 were extensively probed with an auger to determine if there were any extant subsurface cultural deposits. The results of subsurface testing were negative at both sites, and they were defined as surface manifestations only. At 5MT11733, subsurface testing consisted of the excavation of 18 test units in five locales across the site. All artifacts at 5MT11733 were found within 5 cm of the modern ground surface.

Site 5MT11731

Site 5MT11731 covers 1134 m^2 on a south facing slope on land administered by the Bureau of Land Management in Section 20 of Township 36 North, Range 13 West at 2185 m elevation. This lithic scatter, a Seasonal Locus/Use Area Type of site, was the smallest

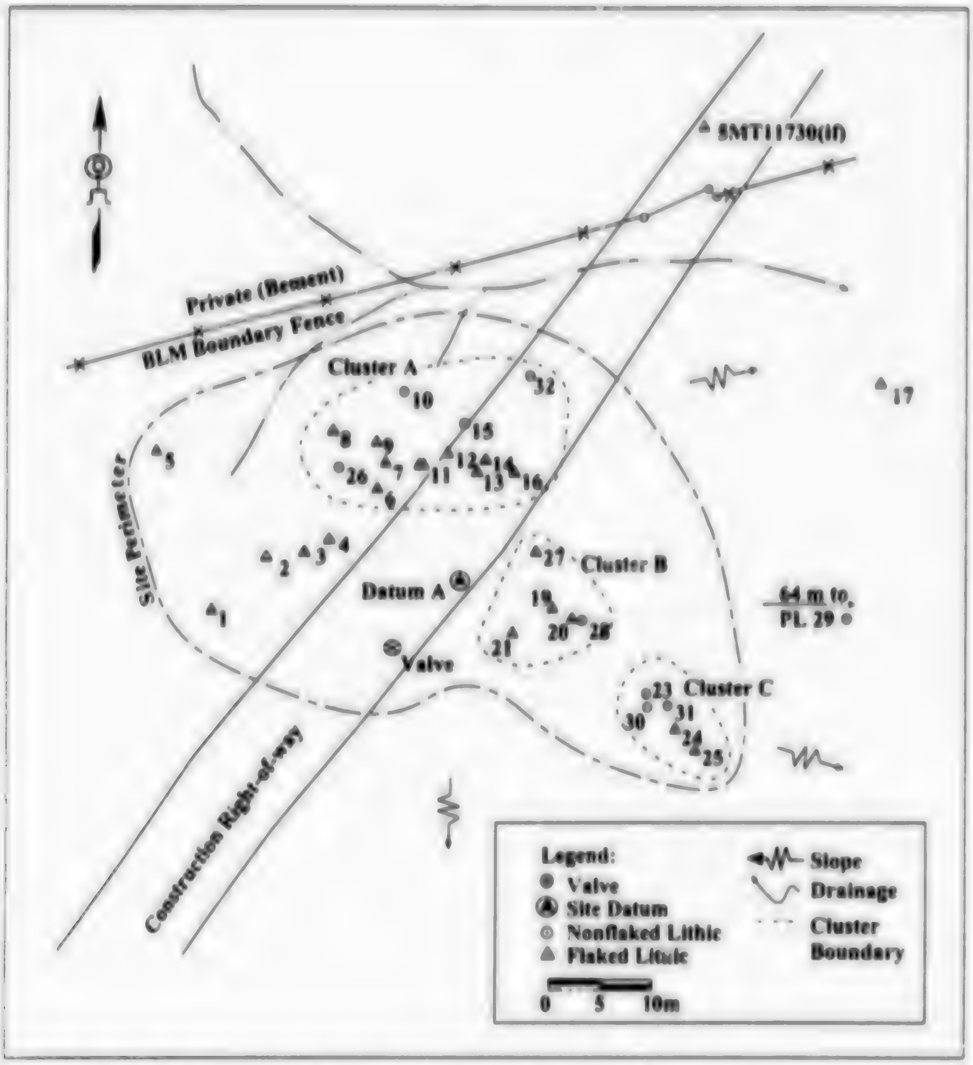


Figure 6.9. Site 5MT11731 plan map showing artifact clusters.

of the three prehistoric sites tested in the Mancos Valley Segment, and the most easterly. The 31 artifacts in the surface collection from 5MT11731 were found in three distinct clusters (A, B, C) which suggest that there were separate use areas or campsite areas within the site (Figure 6.9). In addition, there were two isolated lithic artifacts in the eastern portion of the site which did not fall into any of the three clusters. Fire cracked rock fragments on the site surface suggested that there might be subsurface hearth features so this site was extensively tested with an auger.

Cluster A at Site 5MT11731

There were 19 lithic artifacts associated with Cluster A at Site 5MT11731 (Tables 6.4, 6.5, 6.6, 6.7). Point Locations 1 through 5 actually fell outside of the tight cluster, but due to the slope in this area, they probably originated upslope to the east and were considered as part of Cluster A. In this assemblage there were tools of both flaked lithic (FL) and nonflaked lithic (NFL) (groundstone) material. Flaked lithic tools included a side notched projectile point (Figure 6.10), two asymmetrical bifaces, and a core tool. Nonflaked lithic tools included three manos and two metate fragments. There were three utilized flakes of quartzite. Seven artifacts classified as flaked lithic debitage were found.

Cluster B at Site 5MT11731

Cluster B was located 7 m south and east of Cluster A. In this smaller group, there were five artifacts. Nonflaked lithic tools identified were a quartzite hammerstone and a sandstone mano fragment. There

Table 6.4. Flaked Lithic Tools from 5MT11731

Cluster	PL.	Artifact Type	Material
A	1	Symmetrical Biface	Chalcedony
A	2	Asymmetrical Biface	Chert
A	4	Asymmetrical Biface	Chert
A	16	Core	Chert
B	19	Hammerstone	Quartzite
C	24	Asymmetrical Biface	Quartzite

Table 6.5. Utilized Flaked from 5MT11731

Cluster	PL.	Material	Reduction Stage	Wear Pattern
A	5	Quartzite	Tertiary	Nibbing
A	12	Chert	Primary	Nibbing
A	14	Quartzite	Tertiary	Nibbing
B	20	Andesite	Shatter	Indet.
C	25	Siltstone	Tertiary	Polishing
Isolate	17	Quartzite	Tertiary	Nibbing

Table 6.6. Nonflaked Lithic Tools from 5MT11731

Cluster	PL.	Artifact Type	Material	Heat treated
A	10	Mano, Unshaped 1-hand	Quartzite	No
A	15	Mano, Unshaped 1-hand	Diorite	No
A	26	Mano, Unknown Type	Sandstone	No
A	32	Metate, Unknown Type	Sandstone	Yes
B	28	Mano, Unknown Type	Sandstone	Yes
C	23	Mano, Unknown Type	Sandstone	Yes
C	30	Unknown	Quartzite	Yes
C	31	Mano, Unknown Type	Sandstone	Yes
Isolate	29	Mano, Unknown Type	Quartzite	Yes

Table 6.7. Flaked Lithic Debitage from 5MT11731

Cluster	Pl	Reduction Stage	Material	Type of Wear
A	3	Secondary	Quartzite	Indet.
A	6	Tertiary	Siltstone	Indet.
A	7	Tertiary	Chert	Indet.
A	8	Tertiary	Chert	Indet.
A	9	Primary	Siltstone	Indet.
A	11-1	Tertiary	Chert	Indet.
A	11-2	Tertiary	Siltstone	Indet.
A	13	Secondary	Quartzite	Hammer/ crushing
B	21	Tertiary	Siltstone	Indet.
B	27	Tertiary	Chert	Indet.

was a utilized flake of andesite. The flaked lithic debitage consisted of a tertiary flake of siltstone and a tertiary flake of chert.

Cluster C at Site 5MT11731

Cluster C was located 6 m to the southeast of Cluster B. There were five artifacts in the cluster: two mano fragments, one nonflaked lithic metate or mano fragment, one asymmetrical biface, and one utilized primary flake of siltstone. The two manos were made from sandstone and the other nonflaked lithic fragment was quartzite. The asymmetrical biface was made from fine grained quartzite.

Other Artifacts from Site 5MT11731

Two artifacts were not assignable to any of the clusters. The first of these was a utilized, tertiary, quartzite flake found 31 m east of Cluster A. The second was a quartzite mano fragment located 87 m east and downslope from Cluster B. These items were undoubtedly associated with the site but cannot be directly associated with any of the three clusters.

Summary and Interpretation of Site 5MT11731

The three artifact clusters of Site 5MT11731 were situated in a northwest southeast trending alignment along the surface of a small saddle. This saddle was located along a steep ridge and represents the best route to pass beyond the ridge and on to the Chicken Creek drainage to the northeast. This gap may be thought of as the gateway to the alpine environmental zone or simply as a well-placed campsite location from which to exploit the resources of the pinyon-juniper zone.

The lithic assemblages from the three clusters of this Seasonal Locus/Use Area Type of site were virtually identical and differed only in quantity. The tool inventories suggested both food processing and hunting. The food gathering and processing tools were represented by both mano and metate fragments, utilized flakes, and fragments of bifacial cutting tools. Hunting activity was represented by a single, side notched projectile point which was found in association with Cluster A.

The most common tool type found at the site was the mano. There were seven mano fragments found, each representing an individual item. Two of the manos were complete enough to definitely say they were of the one-hand "biscuit" mano variety. Based on the curvature of the utilized surfaces and the thickness of the other samples, as well as comparisons with other one- and two-hand manos, all of these nine manos were probably of the one-hand variety. Using the same criteria, the metate fragment probably came from a basin metate rather than a slab or trough metate. One artifact from Cluster C could only be identified as a nonflaked lithic either a metate or mano fragment. One-hand manos and basin metates are thought to have been used for processing small wild seeds or pinyon nuts. Archaic and Basketmaker II sites tend to have these types of tools (Kane et al. 1988:218).

The next most frequent lithic artifact type was a utilized flake. There were six utilized flakes in the collection of which three were quartzite, one was siltstone, one was andesite, and one was chert. These were all considered to be low input items in that they were not made in a particular form but were altered by use.

There were six flaked lithic tools from 5MT11731. The single symmetrical biface (projectile point) of translucent chalcedony from Cluster A was independently identified by two lithic specialists as a complete, side notched projectile point characteristic of the Basketmaker II period (Bruce Bradley, Chris Pierce personal communications 1995) (Figure 6.10). The analysis suggested that this was an early site, probably dating to the late Archaic period or Basketmaker II. This hypothesis was strengthened by the fact that the point was made from a fine, microscopic-grained raw material. Tool stone quality chalcedony is not readily available near the site but is a type of material found in high proportions at Archaic and Basketmaker II sites (Kane et al. 1988: 218).

Three flaked lithic tools which also represented high input items, those requiring a much greater expenditure of labor to produce, were identified as asymmetrical bifaces. These tools were also made from finer grained materials than the low input expedient tools. Two of these bifacial tools were made from chert and the third from a fine grained quartzite.

Finally in the Flaked Lithic Tool category, a chert core could be evidence of a prehistoric activity in the initial reduction stage of tool manufacture. The quartzite

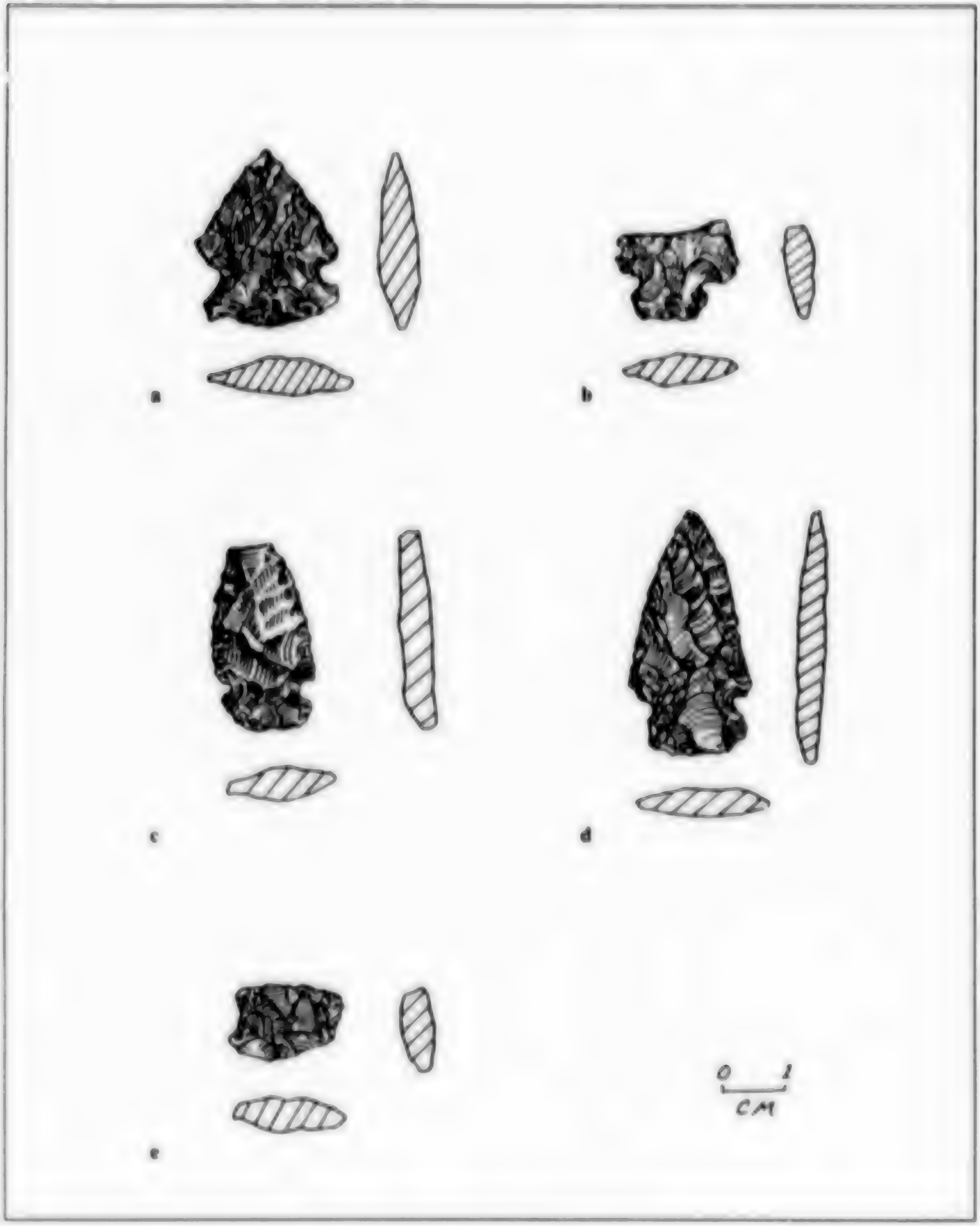


Figure 6.10. Projectile points from sites 5MT11731, 5MT11732, and 5MT11733; (a) 5MT11731, PL 1, chalcedony; (b) 5MT11732, PL 150, quartzite; (c) 5MT11732, PL 152, quartzite; (d) 5MT11732, PL 151, chert; (e) 5MT11733, PL 14, obsidian.

hammerstone could represent evidence of any other task requiring the force of stone on stone.

Overall, the tool assemblage from 5MT11731 gave the impression of a Seasonal Locus/Use Area type of site, probably a base camp utilized by early hunter gatherers, primarily for the acquisition of natural produce, with hunting as a secondary consideration. The three distinct artifact clusters probably represent camps used during different years. The fact that Cluster A was much larger than the others might be indicative of multiple use over several years. The larger groundstone tools such as metates and manos could have been manufactured on site and simply left to be used each time people returned. Despite the presence of fire cracked rock fragments on the site surface, the archeological testing with an auger revealed no subsurface deposits such as hearths which might have existed at 5MT11731. If there were other prehistoric features, they would not have been likely to survive due to the slope of the land, soil type, and historic disturbance.

Site 5MT11732

Site 5MT11732 was a lithic and ceramic scatter of the Seasonal Locus/Use Area Site Type (Figure 6.11). Located in Section 20 of Township 36 North Range 13 West at 2158 m elevation on land administered by BLM, it covered part of the ridge that separates the drainages of Mud Creek and Chicken Creek (Figure 6.1) The characteristics of Site 5MT11732 resembled 5MT11731 with three exceptions. First, this site was more extensive; second, ceramics were present; and third, the site was in a different physiographic location west of the saddle and ridge and near the base of a high knoll. Most of site 5MT11732 was on a fairly gentle southern facing slope which historically has been cultivated. This historical disturbance was probably performed by the occupants of the nearby historic homestead (5MT10969). Above the site the undisturbed slope was covered by a pinyon-juniper woodland. Due to the historic removal of the vegetative cover, the site was cut by numerous small arroyos.

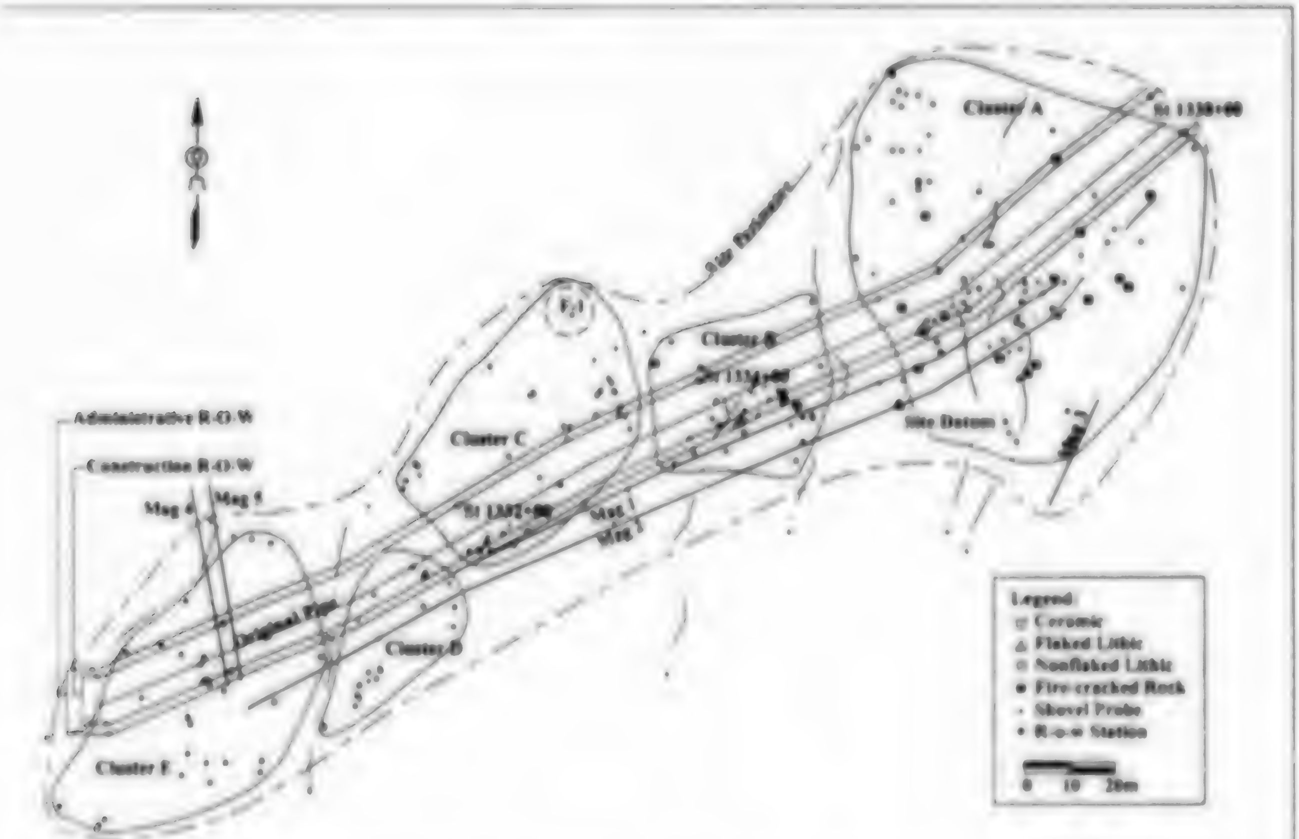


Figure 6.11. Site 5MT11732 plan map showing artifact clusters and pipeline right-of-way.

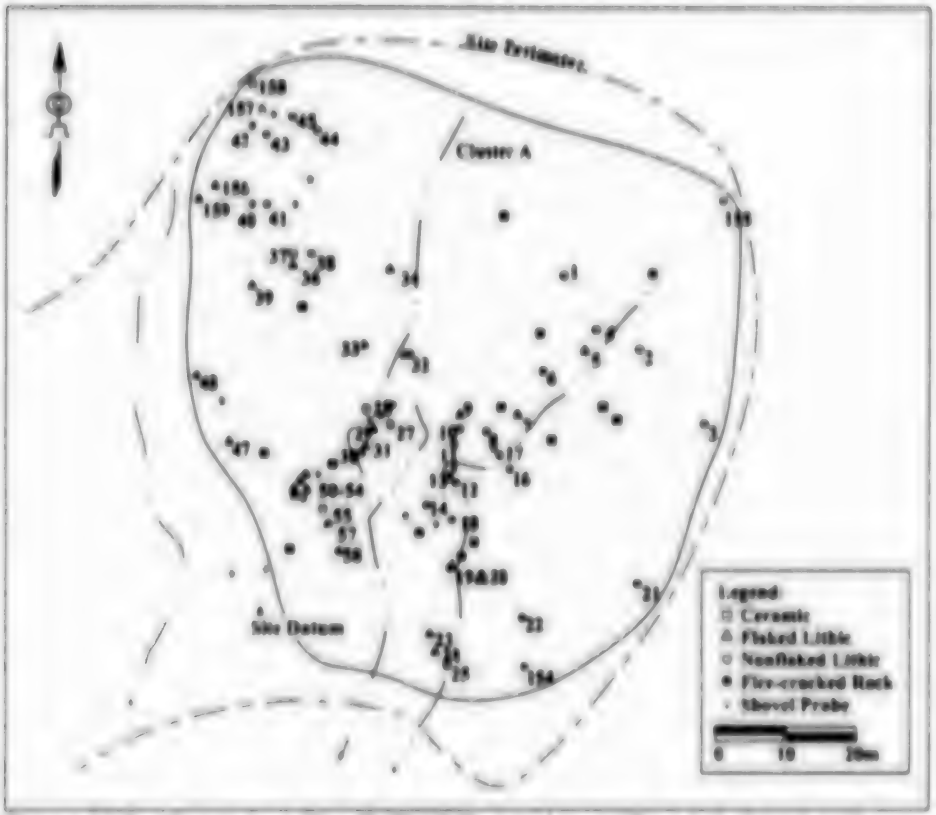


Figure 6.12. Cluster A at Site 5MT11732, showing artifact and shovel probe locations.

The site 5MT11732 measured 310 m east to west and varied in width between 90 and 60 m covering 9000 m². This large scatter of 167 artifacts appeared to be patterned and was divided analytically into five artifact cluster areas (A, B, C, D, E). It seemed likely that the areas represented individual campsites used over a long period of time by many different groups of people who came to exploit the natural resources of the area. Site 5MT11732 subsumed three previously recorded isolated finds (5MT11034, 5MT11035, 5MT11036) (Ives et al. 1993:1). Extensive shovel probe testing did not reveal any subsurface features.

Cluster A at Site 5MT11732

Cluster A was found at the eastern end of the site, and was crosscut north to south by two parallel shallow drainages (Figure 6.12). There was a total of 65 artifacts, both lithics and ceramics, collected from within Cluster A (Tables 6.8, 6.9, 6.10, 6.11, 6.12). The greatest number of lithics was in the nonflaked classification, followed by flaked debitage, utilized flakes, and flaked tools.

Nonflaked lithic tools and fragments, most of which were fragmentary and unclassifiable as to whether they were manos or metates, accounted for the greatest number of artifacts (36) recovered from Cluster A. There was a total of 15 identifiable manos in the collection. Nine of the manos were very fragmentary and were unassignable to a type category. The six remaining manos were of the one-handed unshaped variety. Four of the untyped manos were made from diorite/andesite cobbles, three from sandstone, and two from quartzite. In the one-handed, unshaped mano category, four were made from sandstone and two from quartzite. There were no two-handed manos from Cluster A. Three sandstone metates were recovered, but they were not complete enough to determine if they came from basin, trough, or slab metates.

Altogether, nine flakes showing signs of prehistoric utilization and 13 pieces of flaked lithic debitage were collected from Cluster A. Five of the utilized flakes were made of quartzite, and the most common wear pattern which could be identified (six flakes) was nibbing along one or more edges. There was only one flaked lithic tool in the Cluster A assemblage: an asymmetrical biface fragment made from chert. It appeared to be the midsection of a knife.

Five of the 12 ceramic sherds collected from site 5MT11732 were found in Cluster A. There were five gray ware jar sherds (Gray Body Jar) all tempered with crushed igneous rock indicative of local manufacture. There were only enough attributes to assign the ceramics to a Grouped Type category of Gray Body Jar which means they could have been made between A.D. 450 and 1200. On an intuitive level they looked like early gray ware sherds dating before A.D. 900, before the advent of corrugated utility ware.

Cluster B at Site 5MT11732

Cluster B was a relatively small area located across a small intermittent drainage west of Cluster A (Figure 6.13). There were 27 artifacts collected from this cluster, including four flaked lithic tools, seven utilized flakes, three pieces of lithic debitage, eight nonflaked lithic tools, and five ceramic sherds.

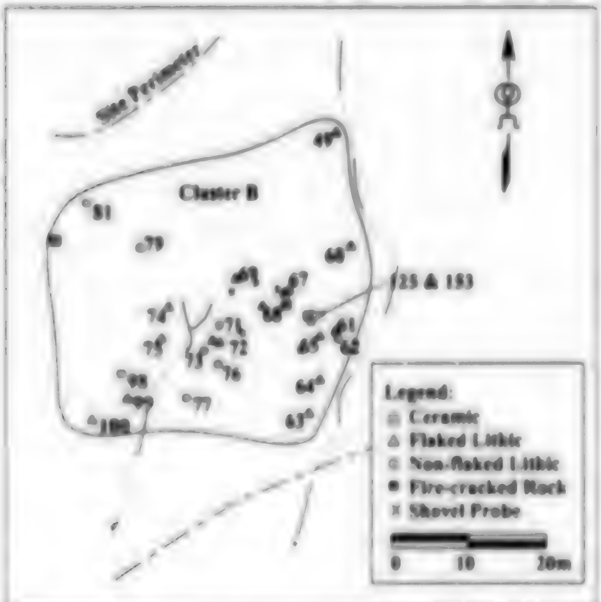


Figure 6.13. Cluster B at Site 5MT11732, plan view showing artifact and shovel probe locations.

Among the four flaked lithic tools on the surface in Cluster B was one asymmetrical biface, a chopper, a core, and a unifacial scraper. The core and biface were made from chert; the chopper was made of quartzite; and the unifacial scraper was made from chalcedony (the only tool made from nonlocal material).

Seven utilized flakes and three pieces of debitage were collected from Area B. The utilization on three of the flakes may have been the result of flake removal from a core, or the flake may have been a spall from a larger tool. Quartzite was the preferred material in both the utilized flake and debitage categories. There were eight pieces of nonflaked lithic tools from Cluster B. Three of these were complete enough to be recognized as fragments of one-hand manos. None of these three was deliberately shaped to create the classic form, commonly referred to as the biscuit mano. One mano could not be identified as to the one- or two-hand type. The manos appeared to be cobbles of sandstone or quartzite which were of a convenient size to be used in a basin type metate. The remaining four items may be from fractured metates which were too small to be positively identified. The concavity of the ground surface on the pieces supported the idea they were metates.

A total of five sherds from a single white ware bowl was recovered from Culster B. These sherds were tempered with crushed sherds indicating a post A.D. 900 time of manufacture (Blinman 1984). There were no painted design elements on any of the sherds, thus it was only possible to assign the sherds to a Grouped Type category.

Cluster C at Site 5MT11732

Cluster C lies west of Area B, separated by a 10 m strip of ground that was void of all cultural material (Figure 6.14). A total of 31 items was collected from this area, eight in a cluster of tabular pieces of sandstone with grinding facets. During analysis these pieces could not be refitted even though at least four of them seemed to be from the same slab. There were no ceramics associated with Cluster C.

There were three flaked lithic tools in Cluster C. One was a quartzite hammerstone, and another was the midsection of an asymmetrical quartzite biface. The third was a complete, late Archaic/Basketmaker II projec-

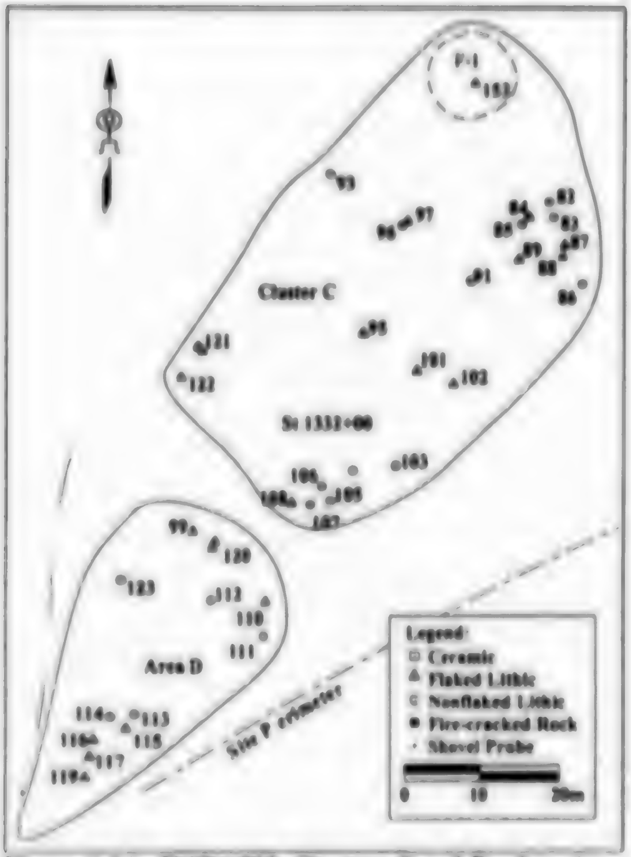


Figure 6.14. 5MT11732, Clusters C and D, plan view showing artifact and shovel probe locations.

tile point found in association with Feature I discussed below.

There were five utilized flakes, three made of quartzite and two of chert as well as six pieces of flaked lithic debitage recovered from Cluster C. In all cases the edge of the utilized flakes showed very small, dimunitive flaking called nibbing, indicating that the flake was used as a cutting or scraping tool. Of the six pieces of debitage, four were quartzite, and two were chert.

Seventeen whole or fragmentary nonflaked lithic tools were collected from Cluster C. Fifteen of these items were complete enough to assign to an artifact type based on shape, size, and the presence or absence of a concavity on the ground surface. Six items were classed as manos and nine as metates. In the mano class, two were unshaped, one-hand; one was a shaped, one-hand, biscuit mano; and three were unclassifiable manos. The nine metate fragments were unclassifiable as to type.

Feature 1 Site 5MT11732, Cluster C

Feature 1 was a mound of historic trash located at the northern periphery of Cluster C. It was included in this discussion because of the Late Archaic/ Basketmaker II projectile point found in association with this mound. The historic artifacts consisted primarily of discarded mason canning jars ca. 1930. They were probably associated with Site 5MT10969, the historic homestead nearby.

Cluster D at Site 5MT11732

Cluster D contained 14 artifacts in a fairly small area defined by a drainage along its western edge (Figure 6.14). Nine of the artifacts in this cluster were flaked lithics, four were nonflaked tools, and one was a white ware jar sherd.

There were two flaked lithic tools associated with Cluster D in site 5MT11732. One was a siltstone chopper, and the other was a unifacial scraper made from rhyolite. There were two utilized flakes and five pieces of flaked lithic debitage associated with Cluster D. One utilized flake was made of quartzite and the other of siltstone. The debitage consisted of two quartzite flakes and one each of basalt, siltstone, and chalcedony.

Only two of the four pieces of nonflaked lithic artifacts were complete enough to assign to a type. These items were both one-hand, unshaped manos made from quartzite river cobbles.

Cluster E at Site 5MT11732

Cluster E represents the eastern most portion of site 5MT11732. There were 30 items recovered from this area, with flaked lithics being the most common, followed by nonflaked lithics, and finally one ceramic sherd from a smooth gray ware jar (Gray Body Jar) with crushed igneous rock temper (Figure 6.15).

There were six flaked lithic tools associated with Cluster E. Two of these were choppers, two were core tools, and two were symmetrical bifaces (projectile points). The projectile points were made from quartzite and chert. The quartzite point was a basal section only, while the chert example was complete (Figure 6.10). Both items were typical of point types found on the Colorado Plateau dating to the late Archaic-early Basketmaker II period (Gilpin 1994:212). One of the

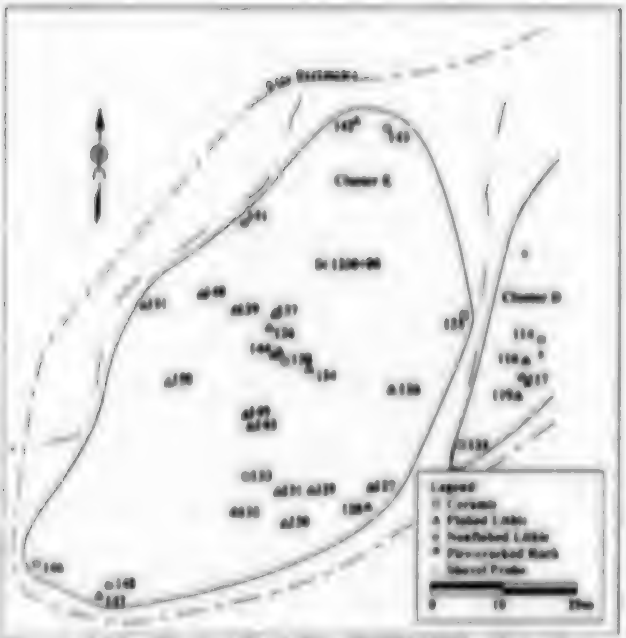


Figure 6.15. Cluster E at Site 5MT11732, plan view showing artifact and shovel probe locations.

two choppers was made of quartzite and the other of siltstone.

There were 10 utilized flakes and five pieces of flaked debitage in the assemblage. Quartzite and siltstone were the most common material type of the utilized flakes representing four specimens each. There was one utilized flake of chert. Four of the debitage flakes were of chert and one of siltstone. Chalcedony was represented by a single utilized tertiary flake and was the only exotic material type.

Within Cluster E, there were eight pieces of nonflaked lithic tools. Three of the tools were classified as one-hand manos and one item classed as a metate of unknown type, the rest were not complete enough to be typed. Five of the items were made from sandstone; two were quartzite cobbles; and one was a from a diorite cobble. All of these material types were available within one km of the site.

Summary and Interpretation of Site 5MT11732

There were five spatially distinct artifact clusters in site 5MT11732, yet each contained a similar inventory of artifact types including flaked lithic tools, utilized flakes, nonflaked lithic tools, and lithic debitage. All clusters also contained small amounts of ceramic materials with the exception of Cluster C. The similar artifact inventory with manos, metates, and utilized flakes as the predominant artifact types may indicate that the clusters reflect similar prehistoric activities related to upland food procurement. Information from projectile point and ceramic analysis indicates 5MT11732 was occupied , perhaps intermittently, from Basketmaker II through late Pueblo I.

Flaked Lithics

All flaked lithic tools were made of locally available raw material with the exception of the uniface of chalcedony (PL 64). The most frequently selected material type was quartzite for tools, utilized flakes, and flaked lithic debitage. Nonflaked lithic tools were made of sandstone, diorite, and quartzite. Many of the tools were heat fractured or oxidized which may be the result of prehistoric utilization.

Although all three lithic reduction stages were represented in the assemblage, it did not appear that lithic tool manufacture was a major activity at this site. Primary flakes are defined as those covered with cortex on the dorsal surface; secondary flakes have some cortex on the dorsal surface but show previous flake

Table 6.8. Flaked Lithic Tools from 5MT11732

PL	Artifact Type	Material
5	Asymmetrical Biface	Chert
60	Core	Chert
64	Uniface	Chalcedony
69	Chopper	Quartzite
99	Asymmetrical Biface	Chert
101	Hammerstone	Quartzite
102	Asymmetrical Biface	Quartzite
152	Symmetrical Biface	Quartzite
120	Uniface	Rhyolite
120	Chopper	Siltstone
122	Core	Basalt
131	Core	Claystone
142	Chopper	Siltstone
145	Chopper	Quartzite
150	Symmetrical Biface	Quartzite
151	Symmetrical Biface	Chert

Table 6.9. Utilized Flakes from Site 5MT11732

Cluster	PL	Material	Reduction Stage	Wear Pattern
A	7	Siltstone	Tertiary	Nibbing
A	9	Quartzite	Secondary	Indet.
A	20	Chalcedony	Secondary	Nibbing
A	31	Siltstone	Primary	Nibbing
A	32	Basalt	Secondary	Nibbing
A	33	Quartzite	Primary	Nibbing
A	39	Quartzite	Primary	Hammer/ crushing
A	48	Quartzite	Tertiary	Nibbing
A	157	Quartzite	Tertiary	Hammer/ crushing
B	49	Siltstone	Tertiary	Hammer/ crushing
B	61	Chert	Tertiary	Indet.
B	63	Chert	Tertiary	Nibbing
B	65	Quartzite	Primary	Nibbing
B	68	Siltstone	Secondary	Hammer/ crushing
B	72	Quartzite	Secondary	Hammer/ crushing
B	75	Quartzite	Tertiary	Nibbing
C	87	Chert	Tertiary	Nibbing
C	95	Quartzite	Secondary	Nibbing
C	104	Quartzite	Tertiary	Nibbing
C	106	Chert	Tertiary	Nibbing
C	121	Quartzite	Secondary	Nibbing
D	109	Quartzite	Secondary	Nibbing
D	114	Siltstone	Tertiary	Nibbing
E	127	Chalcedony	Tertiary	Nibbing
E	129	Siltstone	Primary	Nibbing
E	130	Quartzite	Tertiary	Nibbing
E	132	Chert	Tertiary	Nibbing
E	134	Quartzite	Secondary	Nibbing
E	136	Siltstone	Secondary	Nibbing
E	137	Siltstone	Tertiary	Indet.
E	139	Quartzite	Secondary	Hammer/ crushing
E	140	Siltstone	Secondary	Nibbing
E	147	Quartzite	Tertiary	Nibbing

Table 6.10. Nonflaked Lithic Tools from 5MT11732

Cluster	PL	Artifact Type	Material	Heat treated
A	1	Unknown	Sandstone	Yes
A	2	Mano, Unshaped 1-hand	Sandstone	No
A	3	Mano, Unknown Type	Diorite	Yes
A	4	Mano, Unknown Type	Sandstone	Yes
A	6	Unknown	Sandstone	No
A	8	Unknown	Quartzite	Indet.
A	10	Unknown	Diorite	Yes
A	11	Unknown	Sandstone	No
A	11	Unknown	Diorite	Yes
A	12	Unknown	Sandstone	No
A	13	Unknown	Sandstone	Yes
A	13	Unknown	Sandstone	Indet.
A	13	Unknown	Diorite	Yes
A	13	Unknown	Quartzite	Yes
A	14	Metate, Unknown Type	Sandstone	Yes
A	16	Unknown	Sandstone	Yes
A	17	Mano, Unshaped 1-hand	Sandstone	Yes
A	18	Mano, Unknown Type	Sandstone	Yes
A	19	Unknown	Sandstone	Yes
A	21	Mano, Unknown Type	Diorite	No
A	22	Metate, Unknown Type	Sandstone	Yes
A	25	Unknown	Quartzite	Yes
A	26	Unknown	Diorite	No
A	30	Mano, Unknown Type	Diorite	No
A	32	Mano, Unshaped 1-hand	Sandstone	Yes
A	38	Mano, Unknown Type	Quartzite	Yes
A	40	Metate, Unknown Type	Sandstone	Yes
A	41	Unknown	Quartzite	No
A	42	Mano, Unshaped 1-hand	Quartzite	Yes
A	43	Mano, Unknown Type	Sandstone	Yes
A	43	Mano, Unshaped 1-hand	Quartzite	Yes
A	44	Mano, Unknown Type	Diorite	Yes
A	45	Mano, Unshaped 1-hand	Sandstone	Yes
A	46	Mano, Unshaped 1-hand	Sandstone	Yes
A	52	Mano, Unknown Type	Quartzite	No
A	56	Unknown	Diorite	Yes
A	58	Unknown	Sandstone	Yes
B	62	Unknown	Sandstone	Yes
B	66	Unknown	Sandstone	Yes
B	73	Mano, Unshaped 1-hand	Sandstone	No
B	76	Unknown	Diorite	No
B	77	Unknown	Diorite	No
B	79	Mano, Unknown Type	Sandstone	Yes
B	81	Mano, Unshaped 1-hand	Quartzite	Yes
C	82	Unknown	Diorite	No
C	83	Mano, Unshaped 1-hand	Quartzite	Yes
C	85	Mano, Unknown Type	Diorite	Yes
C	86	Mano, Unknown Type	Sandstone	Yes
C	91	Metate, Unknown Type	Sandstone	Yes
C	93	Mano, Unshaped 1-hand	Quartzite	No
C	96	Metate, Unknown Type	Sandstone	Yes

Table 6.10. Nonflaked Lithic Tools from 5MT11732 (continued)

Cluster	PL	Artifact Type	Material	Heat treated
C	96	Metate, Unknown Type	Sandstone	Yes
C	96	Metate, Unknown Type	Sandstone	Yes
C	96	Metate, Unknown Type	Sandstone	Yes
C	96	Metate, Unknown Type	Sandstone	Yes
C	96	Metate, Unknown Type	Sandstone	Yes
C	96	Metate, Unknown Type	Sandstone	Yes
C	96	Metate, Unknown Type	Sandstone	Yes
B	98	Mano, Unshaped 1-hand	Quartzite	Yes
C	103	Mano, Shaped 1-hand	Sandstone	Yes
C	105	Mano, Unknown Type	Sandstone	Yes
C	107	Unknown	Sandstone	No
D	112	Mano, Unshaped 1-hand	Quartzite	Yes
D	112	Mano, Unshaped 1-hand	Quartzite	Yes
D	113	Unknown	Diorite	No
D	123	Unknown	Sandstone	No
E	133	Unknown	Diorite	No
E	135	Unknown	Quartzite	Yes
E	138	Mano, Unshaped 1-hand	Sandstone	No
E	141	Unknown	Sandstone	Yes
E	143	Metate, Unknown Type	Sandstone	Yes
E	146	Mano, Unshaped 1-hand	Sandstone	Yes
E	148	Mano, Unknown Type	Sandstone	Yes
E	154	Mano, Unshaped 1-hand	Quartzite	No

Table 6.11. Flaked Lithic Debitage from 5MT11732

Cluster	PI	Reduction Stage	Material	Type of Wear
A	23	Shatter	Siltstone	Indet.
A	24	Tertiary	Quartzite	Indet.
A	29	Tertiary	Siltstone	Indet.
A	34	Tertiary	Quartzite	Indet.
A	36	Tertiary	Quartzite	Indet.
A	47	Secondary	Quartzite	Indet.
A	50	Secondary	Siltstone	Indet.
A	51	Tertiary	Siltstone	Indet.
A	53	Tertiary	Siltstone	Indet.
A	54	Tertiary	Quartzite	Indet.
A	57	Shatter	Quartzite	Indet.
A	156	Tertiary	Limestone	Indet.
A	159	Tertiary	Obsidian	Indet.
B	67	Secondary	Quartzite	Indet.
B	78	Shatter	Basalt	Indet.
B	100	Tertiary	Quartzite	Indet.
C	84	Tertiary	Chert	Indet.
C	88	Tertiary	Chert	Indet.
C	89	Secondary	Quartzite	Indet.
C	97	Secondary	Quartzite	Indet.
C	108	Tertiary	Quartzite	Indet.
C	121	Secondary	Quartzite	Indet.
D	110	Secondary	Basalt	Indet.
D	115	Secondary	Siltstone	Indet.
D	116	Secondary	Quartzite	Indet.
D	117	Tertiary	Quartzite	Indet.
D	119	Tertiary	Chalcedony	Indet.
E	126	Secondary	Chert	Indet.
E	128	Tertiary	Chert	Indet.
E	144	Secondary	Chert	Indet.
E	144	Secondary	Siltstone	Indet.
E	149	Secondary	Chert	Indet.

scars, and tertiary flakes have no cortex remaining. The greatest number of the flakes from 5MT11732 were tertiary (32 items) and secondary (25 items) which probably came from a tool sharpening activity. Fifteen tertiary flakes were selected for expedient utilized flake tools. Twelve secondary flakes were utilized and five primary flakes were utilized.

Nonflaked Lithics from 5MT11732

A total of 74 pieces of nonflaked lithic artifacts was collected from the surface of 5MT11732. Most were classified as manos or metates but 29 of the tools were too fragmentary to assign to such an artifact type category. All exhibited one or more grinding facets useful for crushing wild plant seeds.

The most common identifiable artifact type was the mano. Of the 32 manos present one was a shaped, one-hand, "biscuit" mano; 17 were of the one-hand unshaped variety; 14 were too fragmentary to specify as to type of mano.

Metate fragments were the next most common artifact type in the nonflaked lithic collection. There were no complete items, nor were there any fragments large enough to determine the type of metate from which the fragments were derived. The artifact class designation of metate was determined by the concave profile of the ground surface versus the convex facet of a mano. There were 13 metate fragments found at 5MT11732, all of which were sandstone.

Twenty-nine of the nonflaked lithics were too fragmentary to assign to an artifact class which would reflect their tool type in the prehistoric context. They were undoubtedly pieces of either manos or metates. Two factors helped to determine that these nonflaked lithics were artifacts. First, they had one or more grinding facets. Second, they were found in a site dominated by the lithic material of the Mancos Shale Formation which does not usually contain sandstone, diorite, or quartzite of good enough quality for tool manufacture. Since the nonflaked lithic materials out of which the items were made were not locally occurring, it is likely that they were not manufactured at the site but were moved to the site as a result of some human prehistoric activity.

Table 6.12. Ceramics from 5MT11732

Cluster	FI	Type	Form	Temper Type
A	27	Gray Body	Jar	Crushed Igneous
A	28	Gray Body	Jar	Crushed Igneous
A	37	Gray Body	Jar	Crushed Igneous
A	55	Gray Body	Jar	Crushed Igneous
E	124	Gray Body	Jar	Crushed Igneous
B	125	Sherd White	Jar	Sherd
B	153	Sherd White	Bowl	Sherd
A	158	Gray Body	Jar	Crushed Igneous

Ceramics from 5MT11732

Only 12 ceramic artifacts were found at site 5MT11732. There were six smooth gray ware jar sherds (Gray Body Jar) with crushed igneous rock temper; one white ware jar (Sherd White Jar) sherd with sherd temper; and five pieces of one white ware bowl (Sherd White Bowl) with sherd temper.

The sherd tempered vessels suggest a time frame from A.D. 900 - 1300 for the white ware, and the crushed igneous rock temper indicates local manufacture of the gray ware (Flint 1994). The lack of corrugated jar sherds may suggest that the ceramics were deposited in the very early A.D. 900s.

Chronological Assessment

Three chronologically diagnostic projectile points from the Archaic-early Basketmaker II time period (A.D. 1-450) were found at site 5MT11732, one in Cluster C and and two in Cluster E. Sherd tempered ceramics were found in Clusters B and D which may reflect their manufacture in the late Pueblo I, early Pueblo II time period after ca. A.D. 900. This artifactual evidence indicates Site 5MT11732 was used by the prehistoric population over a long period of time from Archaic through Anasazi.

Site 5MT11733

Site 5MT11733 was located 200 m west of the eastern edge of site 5MT11732 in Section 20 of Township 36 North Range 13 West covering 1755 m^2 at 2134 m elevation (Figure 6.1). The other two lithic sites in this area (5MT11731 and 5MT11732) were located on the south facing slope of a northwest/southeast trending ridge that separates the Chicken Creek drainage from the Mud Creek drainage. In contrast, 5MT11733,

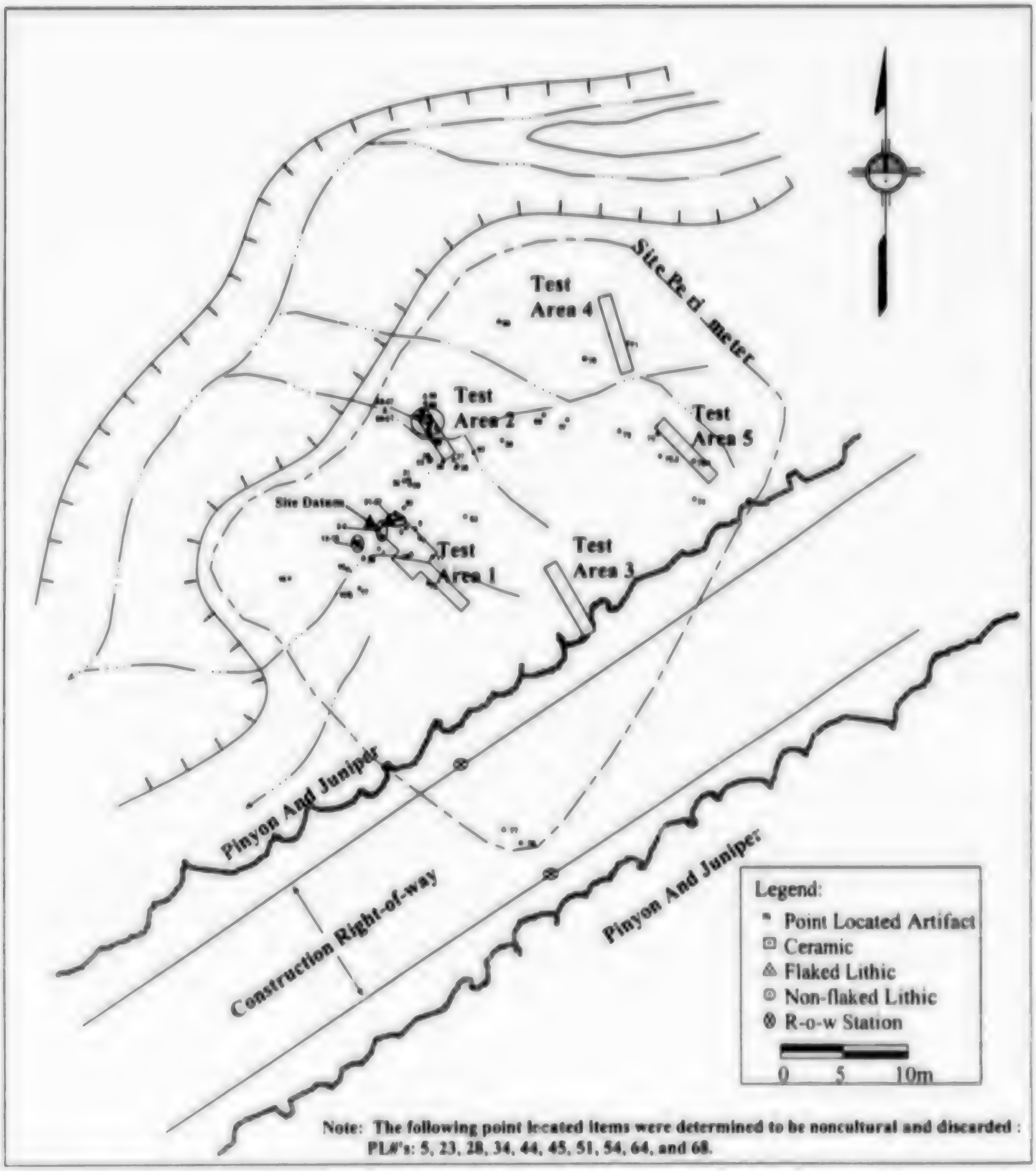


Figure 6.16. Site 5MT11733 showing Test Areas and point located artifacts.

was located on the western shoulder of this ridge on a north facing slope with a rather large arroyo forming its northern boundary (Figure 6.16). This arroyo drains due west toward Mud Creek, and probably has removed some of the northern periphery of the site. 5MT11733 presently lies within a well established pinyon-juniper woodland with an understory of serviceberry and Gambles oak. It was outside of the area that was historically modified by farming practices so that natural erosion was the primary site disturbance. The most southern (upslope) periphery of the site was impacted by the original waterline construction which probably accelerated downslope erosion across the bulk of the site. The lack of post abandonment disturbance meant that there was a possiblity of the presence of subsurface cultural deposits at Site 5MT11733.

Testing Methodology

To determine the presence of subsurface materials, a series of interconnected 1 x 2 m test units was excavated by natural stratigraphy over those areas of the site that either contained concentrations of artifacts on the surface or appeared to be least eroded. Eighteen 1 x 2 m units were excavated in five locales across the site. This method of interconnected study units created five test areas. All matrix was passed through 1/4 inch mesh for artifact recovery.

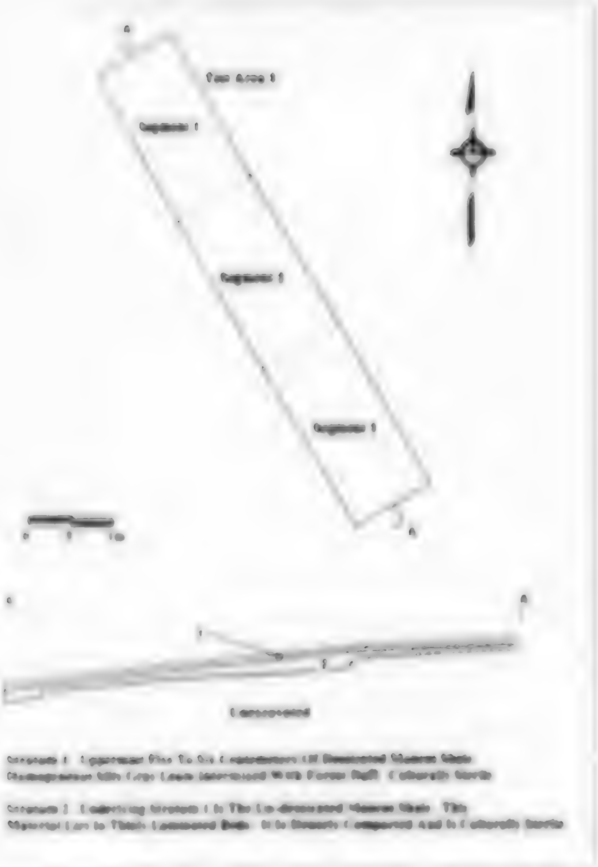


Figure 6.17. Stratigraphic profile of Test Trench 3, 5MT11733.

Stratigraphy

There proved to be no cultural stratigraphy on this site whatsoever. The general stratigraphic profile of all units consisted of an organically rich duff zone followed by a deeper, loose layer of gray, silty, clay loam derived from the underlying Mancos Shale Formation. The stratigraphic profile of Test Trench 3 was characteristic of all of the test units on the site (Figure 6.17). The upper layer of loose desiccated soil gradually became denser as depth increased until the actual Mancos Shale parent material was reached, most often within the first 10 cm in all areas except Test Area 1. There was a natural flat at the north end of Test Area 1 which collected not only sediments washed down from the slope above but also all artifactual material on that same slope. Because of this action, the toe of this slope was the only locus on the entire site that contained any artifactual material not found directly on the modern ground surface. These artifacts all occurred within 5 cm of modern ground surface. At one time all of these artifacts were most likely scattered about on the modern ground surface, but due to natural processes they were carried down a fairly steep grade and deposited at the toe of the slope. For this reason these few (seven) subsurface artifacts were grouped with the other surface finds at the site.

Material Culture

A total assemblage of 107 artifacts was collected from 5MT11733 (Tables 6.13, 6.14, 6.15, 6.16). Seventeen flaked lithic tools, 17 utilized flakes, 22 pieces of lithic debitage, 48 nonflaked lithic tools, and three ceramic sherds. The apparent clustering of artifacts along the northern margins of the site appears to be the result of natural, not cultural, processes (Figure 6.17).

There were 17 flaked lithic tools of which seven were cores; 5 were made of quartzite and 2 of basalt. Following the cores, the most common tools were asymmetrical, bifacial tools of which there were five. Two of these were manufactured from quartzite, two from chert, and one from silicified siltstone. There were two chopper tools, one made from quartzite and one from siltstone. The three remaining tools consisted of one hammerstone, one symmetrical biface, and one unifacial scraper. The hammerstone was made from a quartzite cobble; the uniface was made from a primary quartzite flake; and the symmetrical biface was the basal portion of an obsidian projectile point (Figure 6.10).

There were 17 utilized flakes and 22 pieces of flaked lithic debitage recovered from 5MT11733. Twelve of these utilized flakes were from secondary flakes, four were from tertiary flakes, and only one was from a primary flake of siltstone. In the overall utilized flake and flaked debitage assemblage, 44% of the materials were of quartzite. Siltstone and chert each represented 23%, chalcedony with two items represented 5%, and single flakes of limestone and orthoquartzite represented 3% each. The favored tool stones at this site appeared to be quartzite and chert.

Forty-eight nonflaked lithic tools were collected from site 5MT11733. Six of these items were fragments of groundstone tools that were too small to assign to an artifact type. The remaining 42 tools were either manos or metates. In the mano category there were eight one-hand, unshaped examples and 26 mano fragments too small to classify by type. There were eight metate fragments which were not large enough to type. Not surprisingly 29 or 60% of the nonflaked lithic tools

Table 6.13. Flaked Lithic Tools from 5MT11733

PL	Artifact Type	Material
Surface Collection		
8	Hammerstone	Quartzite
14-1	Symmetrical Biface	Obsidian
14-2	Asymmetrical Biface	Chert
22	Core	Quartzite
24	Core	Quartzite
27	Core	Quartzite
31	Asymmetrical Biface	Quartzite
33	Asymmetrical Biface	Siltstone
53	Chopper	Siltstone
63	Core	Quartzite
71	Chopper	Quartzite
72	Core	Basalt
Test Area 1, Stratum 1		
**	Core	Basalt
**	Core	Quartzite
**	Asymmetrical Biface	Quartzite
Test Area 1, Stratum 2		
**	Uniface	Quartzite
Test Area 2, Stratum 1		
**	Asymmetrical Biface	Chert

**Artifact was not point located.

Table 6.14 Utilized Flakes from 5MT11733

PL	Material	Reduction Stage	Wear Pattern
Surface Collection:			
3	Quartzite	Secondary	Nibbing
4	Siltstone	Tertiary	Nibbing
13	Siltstone	Secondary	Nibbing
38-1	Quartzite	Secondary	Nibbing
47	Siltstone	Secondary	Nibbing
48	Siltstone	Primary	Nibbing
50	Quartzite	Tertiary	Nibbing
55	Quartzite	Secondary	Hammer/crushing
73	Quartzite	Secondary	Nibbing
77	Siltstone	Secondary	Hammer/crushing
Test Area 1, Stratum 1:			
**	Siltstone	Secondary	Nibbing
**	Chert	Secondary	Hammer/crushing
**	Quartzite	Secondary	Nibbing
**	Chert	Secondary	Nibbing
Test Area 1, Stratum 2:			
**	Quartzite	Secondary	Nibbing
**	Quartzite	Tertiary	Hammer/crushing
Test Area 2, Stratum 1:			
**	Chalcedony	Tertiary	Nibbing

** Artifact was not point located

Table 6.15. Nonflaked Lithic Tools from 5MT11733

PL	Artifact Type		Material	Heat treated
Surface Collection:				
1	Mano, Unknown Type		Diorite	No
7	Mano, Unshaped 1-hand		Sandstone	Yes
9	Mano, Unknown Type		Sandstone	Yes
15	Metate, Unknown Type		Sandstone	Yes
16	Mano, Unknown Type		Diorite	No
17	Mano, Unknown Type		Sandstone	Yes
19-1	Unknown		Sandstone	Yes
19-2	Metate, Unknown Type		Diorite	Yes
21	Mano, Unknown Type		Sandstone	Yes
25	Metate, Unknown Type		Sandstone	Yes
26	Unknown		Diorite	Yes
29	Mano, Unshaped 1-hand		Quartzite	Yes
30	Mano, Unknown Type		Sandstone	Yes
32	Mano, Unshaped 1-hand		Siltstone	No
36	Metate, Unknown Type		Sandstone	No
39	Mano, Unknown Type		Quartzite	No
40	Mano, Unshaped 1-hand		Quartzite	Yes
41	Mano, Unknown Type		xxxxx	xx
42	Mano, Unshaped 1-hand		Diorite	No
43	Mano, Unknown Type		Sandstone	Yes
46	Mano, Unknown Type		Sandstone	Yes
49	Mano, Unknown Type		Siltstone	No
52	Mano, Unshaped 1-hand		Sandstone	No
56	Mano, Unknown Type		Quartzite	Yes
57	Unknown		Sandstone	Yes
58	Mano, Unshaped 1-hand		Limestone	No
59	Unknown		Quartzite	Yes
60	Mano, Unknown Type		Sandstone	Yes
60	Mano, Unknown Type		Quartzite	No
61	Mano, Unknown Type		Sandstone	Yes
65	Mano, Unknown Type		Sandstone	Yes
66	Metate, Unknown Type		Sandstone	Yes
67	Mano, Unknown Type		Sandstone	Yes
74	Metate, Unknown Type		Sandstone	Yes
75-1	Metate, Unknown Type		Sandstone	Yes
75-2	Metate, Unknown Type		Quartzite	Yes
76	Mano, Unknown Type		Sandstone	Yes
Test Area 1, Stratum 1:				
**	Mano, Unknown Type		Sandstone	Yes
**	Mano, Unknown Type	(2)	Sandstone	Yes
**	Mano, Unknown Type	(3)	Diorite	No
Test Area 1, Stratum 2:				
**	Mano, Unknown Type		Sandstone	Yes
Test Area 1, Surface 1:				
1	Mano, Unknown Type		Sandstone	Yes
4	Mano, Unknown Type		Quartzite	No
5	Mano, Unshaped 1-hand		Sandstone	Yes
Test Area 2, Stratum 1:				
**	Mano, Unknown Type		Sandstone	xx

**Artifact was not point located.

Table 6.16. Flaked Lithic Debitage from 5MT11733

PI	Reduction Stage	Material	Type of Wear
Surface Collection:			
2	Tertiary	Siltstone	Indet
6	Secondary	Chert	Indet
10	Tertiary	Siltstone	Indet.
11	Secondary	Quartzite	Indet.
12	Tertiary	Siltstone	Indet.
18	Primary	Limestone	Indet.
20	Secondary	Quartzite	Indet.
35	Secondary	Chert	Indet
37	Secondary	Quartzite	Indet
38-2	Primary	Chert	Indet
62	Tertiary	Chalcedony	Indet
69	Tertiary	Ortho-quartzite	Indet
Test Area 1, Stratum 1:			
**	Primary	Chert	Indet.
**	Secondary	Quartzite	Indet
**	Secondary	Quartzite	Indet
Test Area 1, Surface 1:			
2	Secondary	Quartzite	Indet
3	Shatter	Quartzite	Indet
Test Area 2, Stratum 1:			
**	Tertiary	Chert	Indet.
**	Tertiary	Chert	Indet.
**	Tertiary	Quartzite	Indet.
**	Secondary	Quartzite	Indet
**	Secondary	Chert	Indet

** Artifact was not point located

were made from sandstone. Sandstone was followed by quartzite (16%) and diorite (16%), local materials, each with eight items.

There were three ceramic sherds from an early white ware bowl. The rough surface finish, the rim shape and lack of paint indicated it could have been from a Chapin Black-on-white bowl.

Summary of 5MT11733

Site 5MT11733 was the only site of the three lithic and ceramic scatters tested in the Mancos Segment which was located on a north facing slope. Because of the apparent lack of post abandonment disturbance it was extensively tested for the presence of subsurface features. Unfortunately, excavation of 18 test units revealed no cultural stratigraphy or buried features.

The artifact assemblage included 17 flaked lithic tools including an obsidian projectile point base. There were 17 utilized flakes indicating expedient tool use and there were 34 manos and eight metates. Three ceramic sherds from an early white ware bowl (cf. Chapin Black-on-white) were also found. The predominance of nonflaked lithic tools, such as manos and metates, suggested the processing of plant foods was one of the major activities conducted at 5MT11733. The early white ware bowl suggested a chronological date for site occupation of from A.D. 500-800, Basketmaker III through early Pueblo I.

Summary and Comparison of Sites 5MT11731, 5MT11732, 5MT11733

Three Seasonal Locus/Use Area Type of Sites (5MT11731, 5MT11732 and 5MT11733) in the Mancos Valley Segment of the Mesa Verde Waterline Replacement Project Phase III were mitigated by total surface collection and/or test excavations. All of these sites were characterized by a surface scatter consisting primarily of flaked lithic and nonflaked lithic artifacts with an occasional admixture of ceramics. The ceramic artifacts on any one of these sites were always less than 1% of the total assemblage. The similarity of the tool inventory suggested that these sites probably functioned in the same way in the prehistoric human occupation of this area as upland resource procurement sites. Temporally diagnostic artifacts indicated that these sites were utilized by various groups of people ranging from the late Archaic period through the Pueblo period.

Flaked Lithic Tool Comparison.

There were 39 Flaked Lithic tools classified into six types recovered from these three sites: asymmetrical bifaces, choppers, cores, hammerstones, symmetrical bifaces (projectile points), and unifacial scrapers. In all there were 11 asymmetrical bifaces found at the three sites. These tools were probably once part of a knife or scraper. There were 11 cores. Choppers were next in abundance with a total of six, followed by five projectile points. Four of the projectile points stylistically appeared to be from late Archaic-Basketmaker II time period. Three hammerstones and three unifacial scrapers were found. Even though 5MT11731 had neither choppers nor unifacial scrapers, it was the smallest of the three sites and would be expected to have the smallest tool inventory.

All but three of the flaked lithic tools from these sites were made of material from local sources. There were only two nonlocal lithic types and both of them were microscopically grained materials: obsidian and chalcedony. The nearest known source for tool quality chalcedony is in the southeastern corner of Utah, and the Jemez obsidian of north central New Mexico is the nearest obsidian source. Two tools were made from chalcedony and one was from obsidian. These exotic material types could have been obtained by extraregional trade or by travel to the sources.

Local materials used for tools in the assemblage included basalt, chert, claystone, quartzite, rhyolite, and silicified siltstone. Quartzite was particularly popular. Out of a total of 36 tools made from local material, 18 (50%) were made from quartzite, nine (25%) from chert, four (11%) from siltstone, three from basalt (8%), one (3%) from rhyolite, and one (3%) from claystone. Tool stone preferences seem to have been based on both grain size and availability. In other words, the quartzite was not as fine grained as the chert, but it was more abundant in the immediate area. The local cherts in this area derive from the Burro Canyon Formation. The nearest exposures of this formation are found in the Dolores River canyon approximately 24 km (15 miles) northwest of the Chicken Creek sites. Closer sources of chert are present in the local, glacial outwash gravels but are not present in large quantities or in large sized cobbles. Of the 11 cores, it was not surprising that five were quartzite, three basalt, two chert, and one claystone. None of the cores were of nonlocal material indicating that the tools made from chalcedony or obsidian were finished before they were transported to the sites. When the tool type category was compared with material type, most of the high input, bifacial tools came from the finer grained material. There were no choppers or hammerstones made from the finer grained materials. The six choppers in the collection were made from either quartzite or siltstone.

Utilized Flake Comparison

There were 56 utilized flakes in the assemblage from 5MT11731, 5MT11732, 5MT11733. Locally available tool stone materials of quartzite, chert, siltstone, basalt, andesite and orthoquartzite were preferred. Quartzite and orthoquartzite represented fifty percent (28 items) of the utilized flakes. The next most common stone tool type was siltstone (16 items) (28%) followed by chert (8 items) (14%). There were three utilized flakes (5%) of the nonlocal chalcedony.

Flaked Lithic Debitage Comparison

Altogether 64 pieces of flaked lithic debitage were recovered from the Site 5MT11731, 5MT11732, 5MT11733. Locally available tool stone materials were also preferred. Thirty-nine percent (25 items) of the flaked lithic debitage was quartzite. The next most common flaked lithic debitage material was chert (17 items) (26%) followed by siltstone (14 items) (21%). There were two pieces of chalcedony debitage, which was 3% of the total. The quartzite/chert/siltstone ratio (43%/21%/25%) remained fairly constant throughout the three sites. Nonlocal materials were used in low proportions (5%) of the utilized flake and flaked lithic debitage.

There were more utilized flakes (56) than manufactured flaked tools (39) found at the three sites. This seems to suggest a preference for use of expedient tools, which is a characteristic associated with Anasazi site occupation (Kane et al. 1988: 219).

Nonflaked Lithic Tool Comparison

There were 131 pieces of nonflaked lithic artifacts collected from these three sites during the course of mitigation efforts. The greatest number of identifiable tools were manos. In the mano category there were 73 items collected. Metates were represented by 22 fragments. The remaining 36 items were identifiable as fragments of groundstone tools but could not be reliably placed into a specific artifact type. In the mano category there was a single, well shaped, one hand "biscuit" mano. The remaining manos fell into the unshaped, one hand category or the mano of unknown type category. There were 27 unshaped, one hand manos and 46 mano fragments too small to type. Clearly a lot of effort was not expended in the creation of food processing equipment at these sites. The overall impression was that of an expedient technology where any suitable hand sized stone was an acceptable mano and that any large cobble could serve as a metate. The material types for these tools in the order of preference were sandstone (77 items), quartzite (27 items), diorite (24 items), siltstone (2 items), limestone (1 item).

Ceramic Comparison

As opposed to the other material classes found at these three sites, ceramics were almost nonexistent. There was a total of 12 ceramic sherds collected, and these came from only two of the sites. The smallest of the three sites, 5MT11731 had no ceramics in its assemblage. Site 5MT11732, the largest of the three, had 12 of the 15 sherds. These 12 sherds included six gray ware jar sherds with crushed igneous rock temper, one white ware jar sherd with crushed sherd temper, and five pieces of a white ware bowl also with sherd temper. Site 5MT11733 had three white ware bowl sherds with crushed igneous rock temper which compared favorably with Chapin Black-on-white. The occurrence of sherd temper indicates the sites were used from any time after A.D. 900 to A.D. 1300 while the smooth gray jar sherds, Chapin Black-on-white, and lack of corrugated jar sherds may indicate the sites were used from A.D. 500-900. Crushed igneous rock temper indicates the gray jar sherds were manufactured locally using locally available temper.

Chronology and Other Excavated Upland Procurement Sites

Due to the apparent transient nature of these camps no permanent habitation units were constructed, which might have resulted in archeological features with suitable dating material for chronological analysis. Erosion processes removed features, such as hearths, that also might have provided datable material. Such features probably existed at all sites, as indicated by the presence of randomly scattered pieces of fire cracked rock. The specific location of any of these features had been obliterated by both erosion and historic farming. The only chronological indicators left were in the artifact assemblage.

There were two classes of artifacts from these three sites that were more or less temporally diagnostic: the projectile points and the ceramic assemblage. The five projectile points illustrated in Figure 6.10 have been have stylistic attributes associated with the late Archaic/Basketmaker II time period between 2000 B.C. and A.D. 450. Attributes of the ceramics from the sites suggest their use in the Anasazi period from A.D. 500-900.

Few sites of this type have been excavated or reported in this area. Those that have been reported generally were dated by their artifact assemblage rather than absolute dating methods. One exception was Site 5MT2242 or Ridge Line Camp, excavated during the Dolores Archaeological Program (Southward 1988). This lithic and ceramic scatter was a multiple component camp site with functional emphasis on food procurement and processing. A single radiocarbon date, 3710+90 B.P. (Southward 1988:242) defined the Archaic component and placed the initial usage of the area as a campsite toward the end of the Archaic period. Based on the ceramic data, the second and third components defined at Ridge Line Camp were assigned to the Anasazi Pueblo I and Pueblo II periods. The projectile points recovered from 5MT2242 were stylistically close to those from the three sites in the Mancos Valley Segment. Although more artifacts were found at 5MT2242, both the lithic and ceramic assemblages were very much the same as the Chicken Creek sites 5MT11731, 5MT11732, and 5MT11733.

Three other excavated sites near the Mancos Valley also were interpreted as late Archaic-early Pueblo procurement use areas (Spears 1982). These three sites (5LP433, 5LP436, and 5LP437) had the same type of lithic and ceramic assemblage, with high proportions of groundstone tools, as the Mancos Valley Segment mitigated sites and were interpreted by their excavator as procurement sites utilized from the late Archaic period into the Pueblo Period.

Based on the similarity of the lithic and ceramic assemblages of 5MT2242, 5LP433, 5LP436, 5LP437, 5MT11731, 5MT11732, and 5MT11733, it seems likely that all represented upland resource procurement campsites. Similarity of the lithic components of these sites as well as one absolute date of between 1800 and 1620 B.C. from Ridgeline Camp (5MT2242) lead to the tentative conclusion that 5MT11731, 5MT11732, and 5MT11733 probably date to a similar time. Therefore based on artifact typological attributes and ceramic seriation it would appear that the 5MT11731, 5MT11732, and 5MT11733 were seasonally used from about 1700 B.C. until around A.D.1000.

Economy and Adaptation

If these were food procurement camps; were the foods primarily faunal or floral or both? By the plethora of grinding tools and the preponderance of low input, expedient tools, it would appear that the major emphasis at all of these campsites was to exploit the natural floral resources. The low percentage of high input, specialized tools such as projectile points could indicate that hunting was of secondary importance. However, post abandonment processes such as curation could also explain their absence in the assemblage. Lack of lithic debitage would indicate there was not a lot of tool production at these sites.

Floral Resources

Within the immediate area of the sites, 44 species of flora were recorded (Ives et. al. 1993). Sixteen of the economic species in the project area were also previously recovered in the Johnson Canyon cliff dwellings in 1979 (Nickens 1979: 15-25). This by no means exhausts either the existing floral species nor the possible plants that were used prehistorically. One of the most lucrative species in the Mancos Segment would be *Pinus edulis* (pinyon pine). This conifer, on a cyclical basis, produces a tremendous crop of pine nuts which are very high in protein and can be stored for long periods of time in dry conditions. There are numerous plants, such as *Oryzopsis hymenoides* (Indian rice grass), *Yucca baccata* (broad leaf yucca), and *Opuntia sp.* (prickly pear cactus) that were valuable to the prehistoric gatherers for food, medicine, and useful implements. Since these campsites were utilized over such an extended time frame, an exhaustive listing of all present floral resources and their possible uses would be a moot point. As the climatic conditions changed through time, so would the distribution of many of the plant species that were available for exploitation. The same could be said for faunal species available at any one time. Presently the upper Mancos Valley serves in part as a winter range for both deer and elk. However, prior to midwinter, there are no elk and few deer in this area. Lagomorphs, particularly the cottontail rabbit, are common enough today and may have been sought out prehistorically. Predator species such as the mountain lion, bobcat, and coyote are present in the area now, but wolves have not been reported since the turn of the century.

In conclusion one could surmise that during the periods where a favorable weather regime was in place, the Mancos Segment Chicken Creek area would have served nicely as place where both wild floral and faunal products could have been procured. The lack of flaked lithic debitage indicates that in general, finished tools were brought to the sites and not manufactured on site, thus ruling out lithic procurement as a primary function of these campsites.

Summary of Mancos Segment Testing and Mitigation

In the Mancos Valley Segment of the Mesa Verde Waterline Replacement Project Phase III, five sites were tested and mitigated: an historic homestead (5MT10969); the historic Rio Grande Southern narrow gauge railroad grade (5MT4035 Feature 1); and three prehistoric upland procurement camps (5MT11731, 5MT11732, 5MT11733).

The data from these sites provided information on the historic and prehistoric human occupation of the project area including economy and adaptation and social organization. The historic Spanish American homestead was occupied in the mid 1930's and abandoned prior to 1949. Excavations at a general purpose shed on the homestead yielded a tree-ring date of the shed building construction between 1934-1935. The railroad bed was excavated to reveal the construction sequence with use of local limestone and shale. The proximity of the railroad to the historic homestead may indicate an economic relationship. The three prehistoric upland procurement camps seem to reflect a focus on floral resource gathering with a large percentage of nonflaked lithic, groundstone, tools on each of the sites. The artifacts at the camp sites reflect human use from the late Archaic well into the early Pueblo Period Anasazi.

CHAPTER 7

MONTEZUMA VALLEY SEGMENT TESTING AND EXCAVATION: SITES 5MT10834, 5MT11706, 5MT11728, 5MT11729, 5MT10595

Joel M. Brisbin

Introduction

Twelve archeological sites in the Montezuma Valley were mitigated in connection with the construction work for the Mesa Verde Waterline Replacement Project Phase III: 5MT10594, 5MT10595, 5MT10834, 5MT11451, 5MT11452, 5MT11667, 5MT11668, 5MT11706, 5MT11709, 5MT11710, 5MT11728, and 5MT11729 (Figure 7.1). The sites were located along the waterline corridor and on two access roads leading into the pipeline corridor from Montezuma County Road H and State Highway 160. This chapter deals with sites 5MT10834, 5MT11706, 5MT11728, 5MT11729, and 5MT10595. Sites 5MT11451, 5MT11452, 5MT11667, 5MT11668, 5MT11709, 5MT11710 are discussed in a separate document (Dominguez 1996). Site 5MT10594 in the Montezuma Valley was completely excavated and is reported in the succeeding chapter.

The Mesa Verde waterline right-of-way in the Montezuma Valley traversed the southern border of the valley at an average elevation of 2021 m (6600 ft). The landscape is characterized by northeast-southwest trending ridges separated by broad shallow valleys extending out from the foot of the mesa. These valleys, both large and small, fan out into the greater Montezuma Valley, and drain into McElmo Creek. McElmo Creek falls off to the west through McElmo Canyon and empties into the San Juan River near Aneth, Utah.

The vegetative pattern along the waterline corridor in the Montezuma Valley Segment is characterized by pinyon/juniper woodlands on the ridges; sagebrush and grasses in the valleys. Large deep arroyos are a conspicuous feature of the landscape, in part due to historic livestock overgrazing and in part due to climatic changes. The only permanent water sources are seeps and springs found near the heads of these drainages, but these are few and far between.

Site 5MT10834, Basketmaker III Habitation

Site 5MT10834 was located on lands administered by the Bureau of Land Management (BLM) in Section 10 of Township 35 North Range 15 West at 1996 m (6550 ft) elevation. Because it was bisected by the west access road, 5MT10834 was selected by the BLM as a test site for an experimental padding study as part of the mitigation program. The purpose of this study was to determine if covering a prehistoric site with various layers of fabric and gravel would offer enough protection to buffer the impact from heavy equipment traffic across a site. The results of this study are presented in Appendix C.

Site 5MT10834 had all the surface manifestations of a habitation site with a wide variety of artifacts and features. All classes of nonperishable artifacts, such as ceramics, flaked lithics, and ground stone were present. Also present were 10 distinct clusters of oxidized tabular sandstone, which represented features and/or structures. The ceramic assemblage, which accounted for most of the surface material, indicated the site was occupied during the Basketmaker III period. One of the small clusters of oxidized sandstone (Feature 1) and one feature found while blading the road bed (Feature 10) were excavated at this site.

Site 5MT10834 was situated on the extreme southwestern end of a low southwest-northeast trending ridge under the north escarpment of Mesa Verde in the Montezuma Valley. Vegetative cover on the site was sparse and consisted primarily of sagebrush, saltbush, prickly pear cactus and grasses. The site periphery was defined on the south and west by two well-entrenched arroyos, and on the north by a smaller arroyo. A fairly dense scatter of ceramics, flaked lithic, and ground stone fragments covered the site area. This artifact concentration as well as ten clusters of oxidized tabular sandstone (Features 1 through 10) defined the main body of the site.

The plan view of the site is primarily a surface artifact distribution map since the testing program was limited to the road bed itself, where Feature 10 was located, and another feature (Feature 1) just off the south edge of the road (Figure 7.2). At the time of recordation, the existing ranch road had been in use for decades and had cut into the ridge crest as much as 40 cm towards the site center.

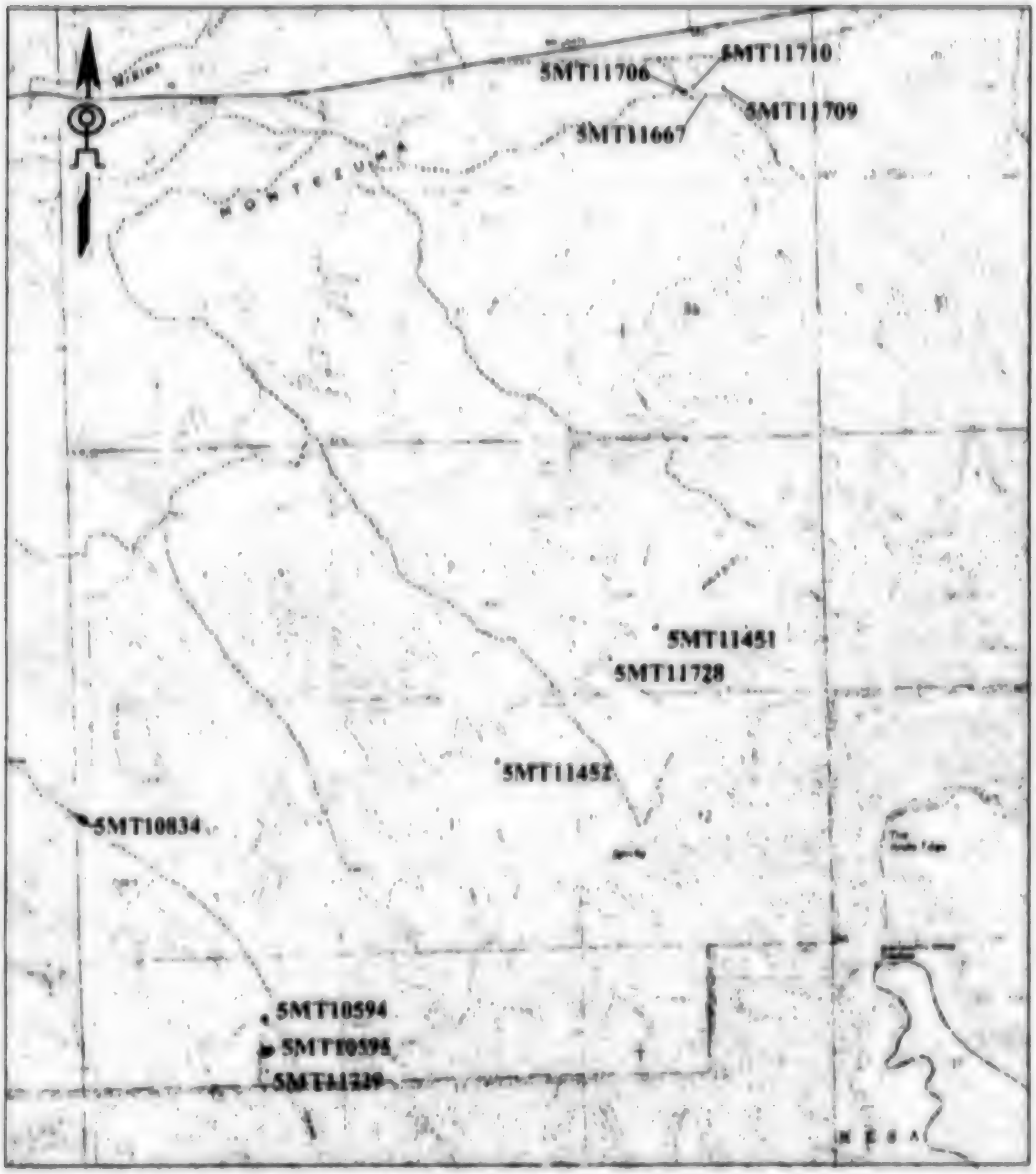


Figure 7.1. Location of sites tested and excavated in the Montezuma Valley Segment: 5MT10594, 5MT10595, 5MT10834, 5MT11451, 5MT11452, 5MT11667, 5MT11668 (not shown), 5MT11706, 5MT11709, 5MT11710, 5MT11728, and 5MT11729 (Point Lookout, CO, 7.5 minute quadrangle, 1973).

After the segment of road which passed over the site was padded, no further work was initiated at the site until construction activities were completed. The removal of the padding and the initiation of the post padding study began on the June 14, 1994.

Testing Methodology at Site 5MT10834

The methodology outlined for Site 5MT10834 consisted of the following procedures. The first step was to point plot all artifacts on the site surface in order to create an artifact distribution map. Since testing and excavation were to be extremely limited at 5MT10834, the distribution of surface artifacts might be the only clue to understanding the spatial layout of the site's architectural features. With the distribution map in hand, a base line 36 m in length was laid out across the most likely area where a pithouse might be expected. Auger holes were then drilled at 2 m intervals along

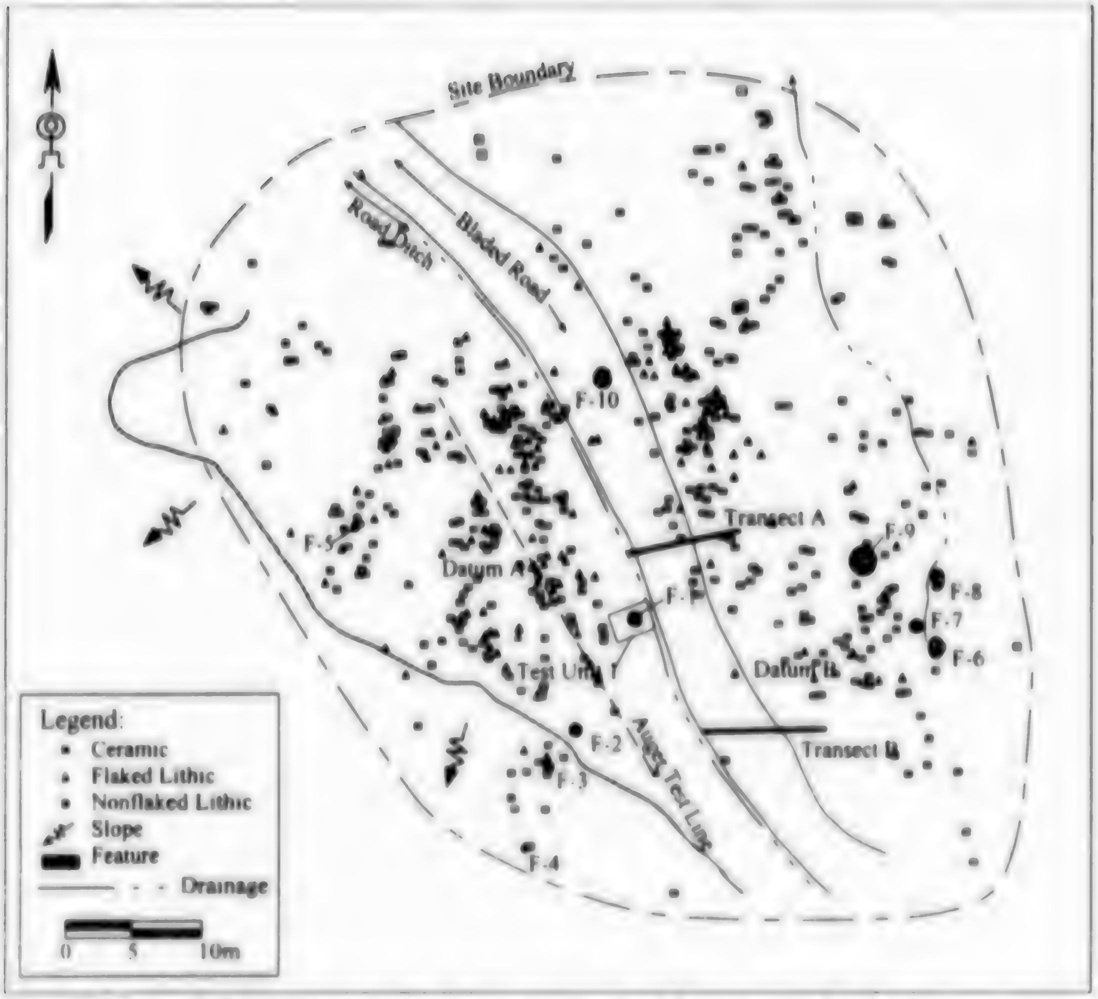


Figure 7.2. Site 5MT10834 plan view showing artifact and feature distribution.

the length of the base line with negative results. No subsurface features were detected.

The next step was to remove the padding material over the road bed using a Case 580 series backhoe. Once the road bed was exposed and the post padding compaction tests completed the entire road was bladed flat down to the depth of the deepest tire track.

As the blading progressed any discoloration or stain which was observed was marked with a pin flag for subsequent testing. Of the more than 25 stains observed and marked only one (Feature 10) eventually proved to be a prehistoric feature. Another feature (Feature 11), was initially perceived as a borrow pit containing some cultural trash. Eventually the feature was defined as a post abandonment arroyo cut into which artifacts had been deposited by natural processes.

All stains were tested or excavated as if they were known cultural features. First the limits of the stains were defined horizontally and then bisected. Depending on the size of the stain the bisection was either done with a test trench or by removing the fill from half of the feature to afford a clear profile. When a feature was positively identified as cultural, radiocarbon and bulk soil samples were taken.

Feature 1 at Site 5MT10834

Feature 1 was a slab lined hearth 80 cm in length, 63 cm in width and 35 cm in depth. This feature was oval in plan view and basin shaped in profile (Figure 7.3). The steeply sloping sides were roughly lined with pieces of tabular sandstone and one fragment of a trough metate. A large water worn cobble of sandstone had been placed in the bottom of the feature. This cobble was 17 cm thick and 36 cm in length. It is uncertain

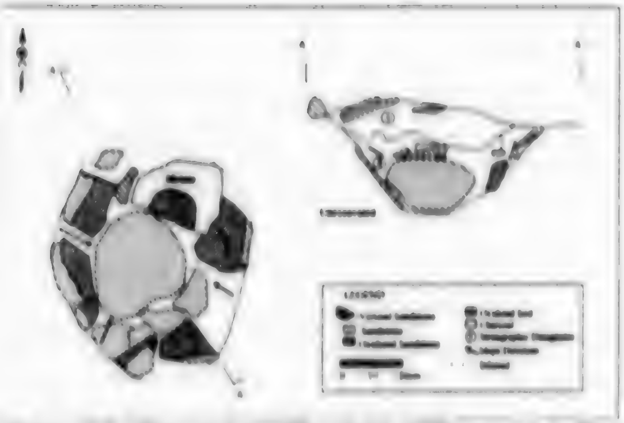


Figure 7.3. Plan and profile views of Feature 1 at Site 5MT10834.

whether this stone was an integral part of the feature or had been dropped into the feature at the time the feature was abandoned.

The oxidized condition of the lining slabs, as well as the charcoal fragments indicated that Feature 1 functioned as a hearth. Since there was no stratum of concentrated charcoal and ash except between and behind the lining slabs it appeared that this hearth had been cleaned out prior to its abandonment. Other than the fragment of a trough metate that was used as part of the construction, there were no artifacts within Feature 1. However, there were two items lying on the prehistoric use surface near Feature 1. One of these items was a two-hand sandstone mano and the other was a grayware body sherd. It is unknown whether either of these items was related to this activity area or deposited at a later time. A final item was found in the duff zone overlying Feature 1. This was the dorsal face of a small notched axe made from silicified siltstone. Interestingly enough, the ventral face of this tool was found on the surface of the midden, 14 m to the southwest.

Feature 10 at Site 5MT10834

Feature 10 at Site 5MT10834 was a large basin shaped pit, with a roughly circular plan view (Figure 7.4). The feature was 94 cm in length by 88 cm in width, with a maximum depth of 22 cm. The fill within the feature was a homogenous brown, silty, highly compacted clay. Interspersed throughout this clay were charcoal fragments, and a light scattering of artifacts. These artifacts consisted of two ceramic sherds, one fragment of sandstone with some peck marks, one flake, and a hammerstone. All of these items appeared to have been surface artifacts washed into the feature after it was abandoned. The ceramics were grayware body sherds with crushed igneous temper.

Within the upper fill as well as around the periphery of the feature there were numerous pieces of sandstone. It is possible that at one time the pit had been lined with sandstone slabs. Upon abandonment many of the slabs could have been removed for use elsewhere and the unwanted material left around the edge of the feature. Because of the slope of the site, some of this discard material would have eventually found its way back into the feature.

Determining the prehistoric function of Feature 10 is problematical. The lack of oxidation on the walls or bottom of the feature does not necessarily rule out its use as a hearth if it had indeed been slab lined at one time. The Mancos Shale derived soil into which Feature 10 was built does not retain oxidation well if a

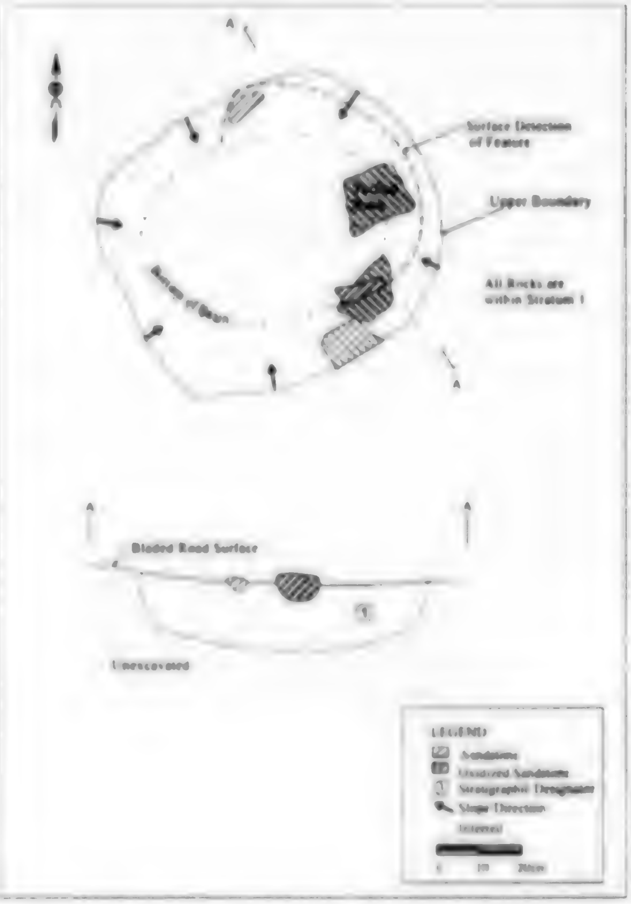


Figure 7.4. Plan and profile views of Feature 10 at Site 5MT10834.

feature was left open and exposed to the elements. On the other hand, this feature may have served as a storage pit and the sandstone fragments may have been simply dumped near and on it at a later date. It is probable that some of the upper wall height of this feature was destroyed historically by vehicular traffic.

Surface Collection from Site 5MT10834

During the course of earlier site recordation efforts, those artifacts which fell within the construction corridor were collected and analyzed. By far the greatest percentage of the material consisted of ceramic sherds. There were very few lithic artifacts.

Ceramics at Site 5MT10834

Altogether there were 216 sherds collected from the surface of this site. Most of the ceramics (102) came from plain gray utility ware jars (Gray Body Jar) (Table 7.1). Of the other grouped ceramic types, there were 84 sherds of Polished White, 12 Painted Black-on-white, four Slipped White, one Early Pueblo Red, and one Corrugated Body. There were only 12 sherds with enough distinguishing attributes to be classified within a Formal type. Three of these were Chapin Black-on-white, three were Chapin Gray, three were Mancos Black-on-white, and three were Piedra Black-on-white. The 216 sherds were dominated by Gray Body (47%) and Polished White (39%). One Corrugated Body sherd, three Mancos Black-on-white and four Slipped White sherds were probably intrusive onto the site. There are no surface indications of a Pueblo II occupation at the site but there are a number of small Pueblo II hamlets upslope in the immediate area.

The absence of neckbanded grayware (Moccasin Gray and Mancos Gray) in a sample greater than 60, in general, indicates a date before A.D. 775 and after A.D. 980 (Blinman 1984b: 48), while the presence of Early Pueblo Red indicates a date beginning after A.D. 700. With the preponderance of grayware, the presence of Piedra Black-on-white as well as Chapin Black-on-white, an occupation date range for 5MT10834 between A.D. 725 and A.D. 750 is suggested. This rather tight ceramic date would place the site occupation in the Late Basketmaker III period. This assignment fits well with observable surface indications at the site. It is suspected that some of the isolated clusters of oxidized tabular sandstone mark the locus of typical Basketmaker III, noncontiguous, storage rooms (Brisbin 1986). The oxidation on the stones may indicate that the structures were destroyed by fire.

That the pottery was all of local manufacture was indicated by the fact that 100% was tempered with

Table 7.1. 5MT10834 Ceramic Types and Forms

	Jar	Bowl	Seed Jar	Indeterminate	N	%
Plain Gray Body	98			4	102	47.0
Chapin Gray	2		1		3	1.4
Corrugated Body	1				1	.5
Painted White	2	9	1		12	5.5
Polished White	37	46		1	84	39.0
Slipped White	2	2			4	1.8
Chapin B/W	3				3	1.4
Piedra B/W		3			3	1.4
Mancos B/W	2	1			3	1.4
Early Pueblo Red	1				1	.5
N	145	64	2	5	216	100.0
%	67	30	1	2	100	

crushed igneous rock (211), or crushed igneous rock and sandstone (5). This is an attribute characteristic of the Mesa Verde Region (Breternitz, Rohn, and Morris 1974; Wilson and Blinman 1993).

The ceramic assemblage contained three identifiable vessel forms and one indeterminate category. There were 145 jars represented, 64 bowls, 2 seed jars, and 5 indeterminate. The one sherd of Early Pueblo redware was from a bowl. The bowl/jar ratio of 4 to 9 is fairly common in any Pueblo ceramic assemblage particularly in the pre-Pueblo II inventory.

Lithic Artifacts at Site 5MT10834

A total of 65 pieces of flaked lithic material were collected, only one flaked lithic item was categorized as a tool, a sandstone core/chopper. The 64 pieces of flaked lithic debitage appeared to be the result of flake production from cores of primarily local material (Table 7.2). Locally available quartzite was the most common material type 48% (31), followed by basalt 25% (16), then chert 23% (16), one sandstone (2%) and, one piece of chalcedony (2%). The chalcedony was the only material type that is not available locally.

There were three nonflaked lithic artifacts found at Site 5MT10834: one hammerstone; an unmodified cobble, and a single, one-hand, unshaped sandstone mano exhibiting pecking and heavy battering.

Interpretation of Site 5MT10834

Unfortunately the scope of mitigation work at 5MT10834 was not wide enough to allow much of a definitive statement concerning the spatial layout of this site. The artifact distribution map shows a fairly homogenous artifact scatter covering a fairly large area. There are three arroyos around the site that played a major part in this pattern. Many of the artifacts at the north end of the site had been displaced in that direction by downslope erosion towards the small arroyo located in that area. To the south and southwest artifacts had drifted downslope towards two much larger arroyos. This shifting of the surface artifact assemblage created a pattern reminiscent of a midden area associated with architectural units upslope to the northeast.

The small clusters of oxidized tabular sandstone throughout this site area may be the remnants of hearths and/or processing pits that had been constructed in or near the midden. These clusters do not form the type of crescentic pattern that commonly marks the locations of the noncontiguous storage rooms found on Basketmaker III habitation sites. These storage rooms will normally be found to the west and north of one or more pitstructures (Brisbin and Varien 1986). However, features of this type are not normally found in the midden area in this great a number.

The actual locations of the storage rooms and pitstructure associated with this site are unknown. The artifact concentration may be nothing more than the midden area of a Basketmaker III habitation site with the rest of the site located upslope to the northeast. On the other hand, erosional factors rampant on the site may have spread the midden deposits to a point that the locus of architectural features has been obscured.

The quantity and diversity of the assemblage clearly indicated that 5MT10834 was a habitation. The total lack of Moccasin Gray neckbanded pottery placed the occupation prior to A.D. 775, and the presence of early

Table 7.2 5MT10834 Flaked Lithic Debitage Forms and Material Types

	Primary	Secondary	Tertiary	Shatter	N	%
Basalt	5	8	2	1	16	25
Chalcedony				1	1	2
Chert	5	6	2	2	15	23
Quartzite	4	19	6	2	31	48
Sandstone		1			1	2
N	14	34	10	6	64	100
%	22	53	15	9	100	

Pueblo redware placed it after A.D. 700. Based upon the archeological evidence, Site 5MT10834 was a late Basketmaker III habitation site which was occupied at some point between A.D. 725 and A.D. 750.

Site 5MT11706, Pueblo II Habitation

Site 5MT11706 was part of a Pueblo II masonry roomblock on which construction was started but never completed. Stratigraphic evidence suggests that flooding may have been the causative factor for this abandonment. Most of the room block was constructed on the extreme eastern edge of a broad flood plain. Prehistoric ground leveling activities and the construction of the lower courses of two walls were evident at the site. No evidence could be found to indicate that a kiva had been constructed or begun, or that the site had been occupied.

Site 5MT11706 was located in Section 25 of Township 36 North, Range 15 West at the elevation of 1841 m (6040 ft). It was discovered in the middle of the east access road during a blading operation. Prior to the road blading there was no surface evidence of the site whatsoever.

The broad flood plain on which Site 5MT11706 was located is slightly basin shaped in cross section and during times of heavy precipitation small ponds form across its surface. This flood plain was probably drained by one or two shallow channels prior to the climatic regime associated with arroyo cutting in the Montezuma Valley around the turn of the 20th century. During periods of heavy precipitation, water may have periodically breached the channel banks and spread across the flood plain. Today this flood plain is primarily covered by sagebrush and saltbush with very little grass understory. Based on early historic accounts from the Spanish to the Euro-American homesteaders, this area was a lush grassland before the introduction of livestock. The soils of the flood plain are derived from the decomposed Mancos Shale and Point Lookout Sandstones brought down from the higher elevations by alluvial action. Another soil type found in scattered pockets throughout this area is eolian derived loess. A pocket of this loess is located directly east of the site and extends partly beneath it. If the builders had finished the construction of the structure on the site, part of it would have been on this loess and part would have been on the flood deposits.

Around the edges of the flood plain and scattered around throughout it there are erosional remnants of higher ground which are basically stream bed deposits. These homogeneous deposits are composed of silty sands, rounded sandstone fragments, and water worn gravels. All of the known sites in this area with the exception of 5MT11706 were located on these low hummocks and ridges. The prehistoric structure at 5MT11706 was constructed at the base of one of these low ridges on the eastern margin of the flood plain.

Methodology at Site 5MT11706

After it was exposed by the blade of a large front end loader, the site appeared as two parallel rows of coursed masonry set 1.2 m apart (Figure 7.5). Until the construction phase of the Mesa Verde Waterline Project Phase III east access road upgrading was complete this site was covered with filter fabric and backfilled with road gravel and dirt. Archeological work was resumed on August 11, 1993 following the treatment plan approved for the site (Ives and Brisbin 1993). The first step was to remove the padding with the aid of a backhoe. After the padding was removed, a 12-x-5 m excavation block was established to encompass the visible walls. This unit was designated as Area A.

The next step was to subdivide Area A into smaller 2-x-2 m excavation units. As part of the crew began work in these individual units, others began a series of test trenches along both sides of the visible walls to locate any cross walls which would define the size and shape of individual rooms. Concurrent with these excavations, an east-west stratigraphic test trench was cut across the center of the roomblock.

It was soon apparent that no cross walls were present and that this was an unfinished room block. The narrow width between the two parallel walls suggested that these were intended to form the west and east walls of storage rooms. Excavation to the east of the easternmost wall to find any living rooms plainly showed that the living room foundations had never been started.

Finally a Case 580 backhoe was brought in to excavate a series of east/west parallel trenches in the area where a kiva would normally have been placed. A linear series of eighteen auger holes was also drilled in this area. These trenches and auger tests revealed nothing but undisturbed native soil. The hand dug

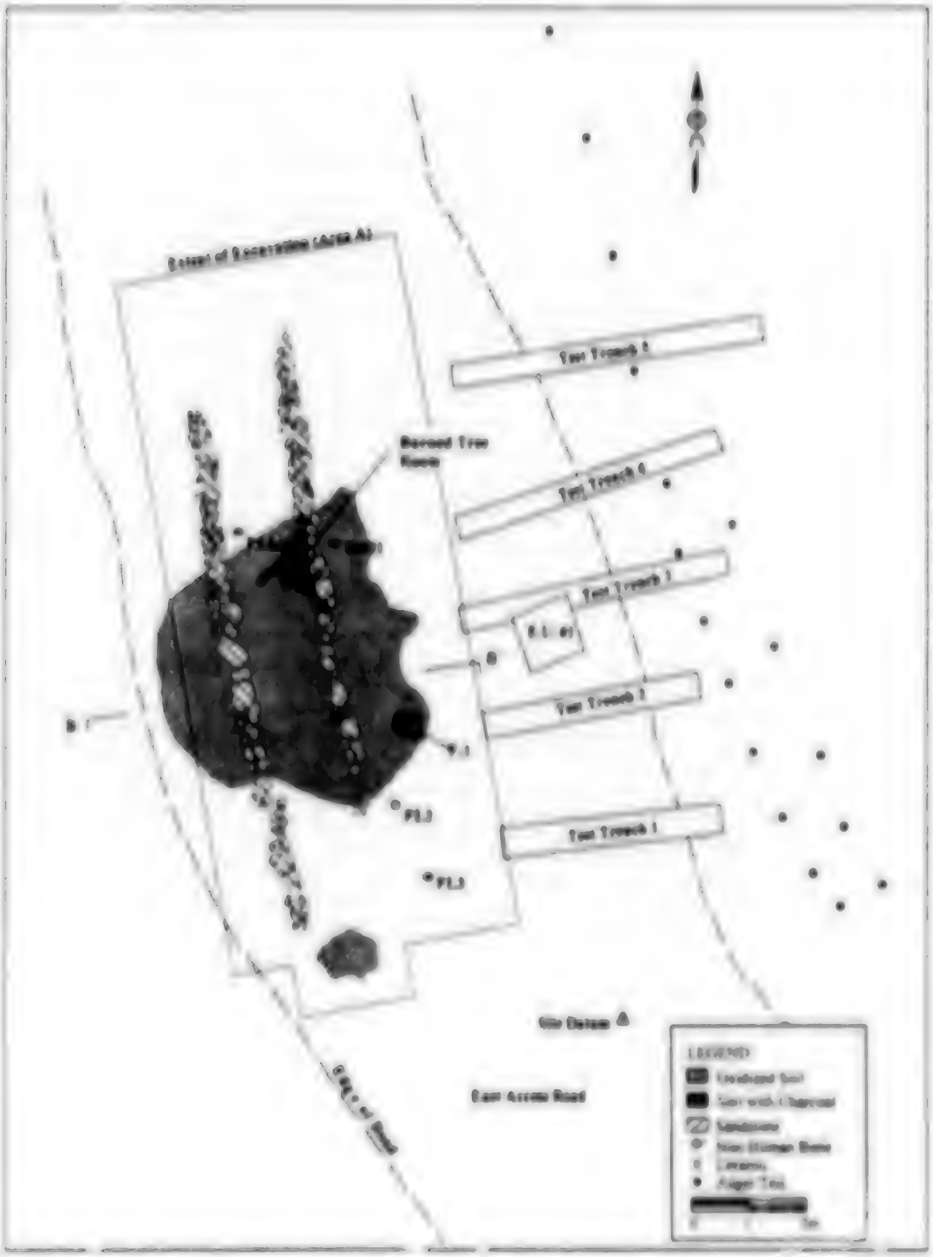


Figure 7.5. Plan map of Site 5MT11706.

stratigraphic trench across the roomblock area and the mechanically dug trenches revealed the nature of the undisturbed native soils and eventually proved to be the keys for interpreting the site history.

Architectural and Feature Descriptions Site 5MT11706

5MT11706 consisted of two parallel masonry walls and one basin shaped pit feature (Figure 7.6). The uppermost course of the mansonry walls was badly crushed by the front end loader during the site discovery. Fortunately throughout this traumatic experience the wall stones were not laterally displaced, thus their configuration was not lost.

From the surface, the first impression was that both walls were double coursed masonry built by apprentice masons. However, it was the crushing effect from the front end loader which created this impression. If the undamaged basal course of stone can be considered a reliable witness, then these walls in reality were meant to be of single coursed masonry construction. The average width of both walls was 30 cm and the

Figure 7.6. Photograph of parallel masonry walls at Site 5MT11706, looking northwest.

average distance between the walls was 1.3 m. This width between walls was relatively narrow and suggested that these two walls were to be the west and east walls of storage rooms.

The walls were constructed of sandstone of both block and tabular form which could have been obtained from the nearby remnants of stream bed deposits in the area. Shaping of the stones ranged from minimal to nonexistent. The schematic plan view of this site shows the projected position of these walls within the pueblo if the roomblock had been completed (Figure 7.7). The mortar used between the courses was Sharps Loam (RdLC) found directly east of the existing easternmost wall. This soil is one of those pockets of wind deposited eolian loess which is an excellent mortar because of its high clay and sand content.

Feature 1 was oval in plan view and basin shaped in profile (Figure 7.8). The feature was 52 cm in length, 42 cm in width, and 8 cm in depth. On the very bottom of the feature there was a thin lens of ash interspersed with charcoal flecks. Beneath this lens, the surface of the feature exhibited slight oxidation. The major part of this feature was filled with a grayish brown silty clay interspersed throughout with charcoal flecks. The homogenous distribution of this charcoal throughout the matrix suggested that it was a post abandonment deposit. The most likely source for this charcoal would be from a tree that was apparently burned when the site was cleared. This tree was located 3 m to the

Figure 7.7. Hypothetical schematic of uncompleted pueblo at Site 5MT11706.

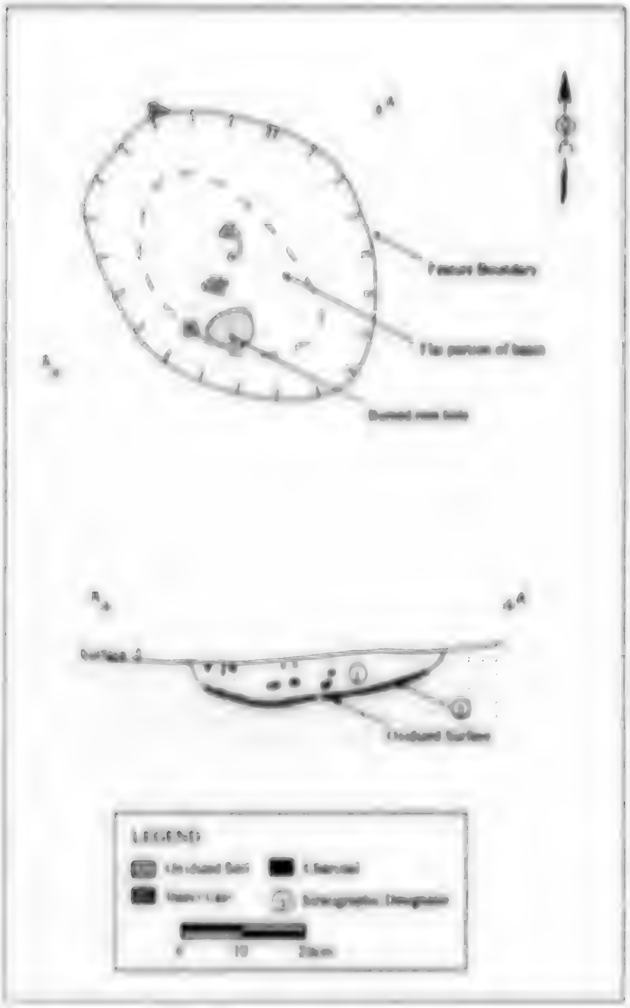


Figure 7.8. Feature 1 at Site 5MT11706, plan and profile.

north. Feature 1 cut through an oxidized surface which did not exist before the tree was burned indicating that Feature 1 was constructed after the tree was burned.

Feature 1 was a simple pit scraped into the natural surface and seemed to have served as a short term hearth. The shallow depth, irregular bottom, and lack of a sandstone lining suggested that little labor was expended to construct this feature.

Site 5MT11706 Stratigraphy

Five strata were identified in the east-west stratigraphic profile across Site 5MT11706 (Figure 7.9). Stratum 5 was the lowermost identified stratum on the site. This was a natural eolian deposit of Sharps Loam. This soil had a brownish orange color and had a fairly high clay content. Stratum 4 was also a natural deposit and consisted of sediments derived from the decomposition of Mancos Shale and Dakota Sandstone (Sideshow Zigzag Soil Complex). This was an alluvial deposit that accumulated in the basins and hollows below the Mesa Verde cuesta since the early Pleistocene. During the prehistoric occupation of the area these sediment-filled basins were the flood plains for the shallow drainages which crossed them. Site 5MT11706 was built on the edge of one of these flood plains and Stratum 4 represented the thin terminal edge of these sediments. The thickness of Stratum 4 increased rapidly to the west, (as noted in arroyo cutbanks) as the sediments dipped down into the basin.

The hydrology responsible for Stratum 4 was the key to why this building site was abandoned before the roomblock was completed. Stratum 3 was a cultural construct and indicated that the builders were fully aware of the flood potential at their building site. This stratum was a mixture of both Strata 4 and 5 materials. Stratum 3 was an earthen berm of soil built up behind and along the entire length of the westernmost wall of the structure probably to deflect or block water from inundating the site.

Stratum 2 appeared to be the remains of adobe foundation footers that were placed beneath the two walls prior to construction. Stratum 1 was a post abandonment deposit of the same flood plain material as Stratum 4. This stratum emphasized that the periodic flooding processes which caused the building site to be abandoned prehistorically are still operable today. The choppy nature of Stratum 1 in the area between the two walls represented wheel ruts caused by historic vehicles trying to cross this stretch of road when it was wet.

Material Culture at 5MT11706

The material culture recovered from this site was understandably sparse. Only six ceramic sherds and three pieces of animal bone were recovered from the site.

Ceramics

Six ceramic sherds were recovered from 5MT11706. Four of these sherds were plain Gray Body jars with crushed igneous rock temper and two were Polished White jar sherds with sandstone temper that were found in the wall mortar. Smooth Gray Body jar sherds and

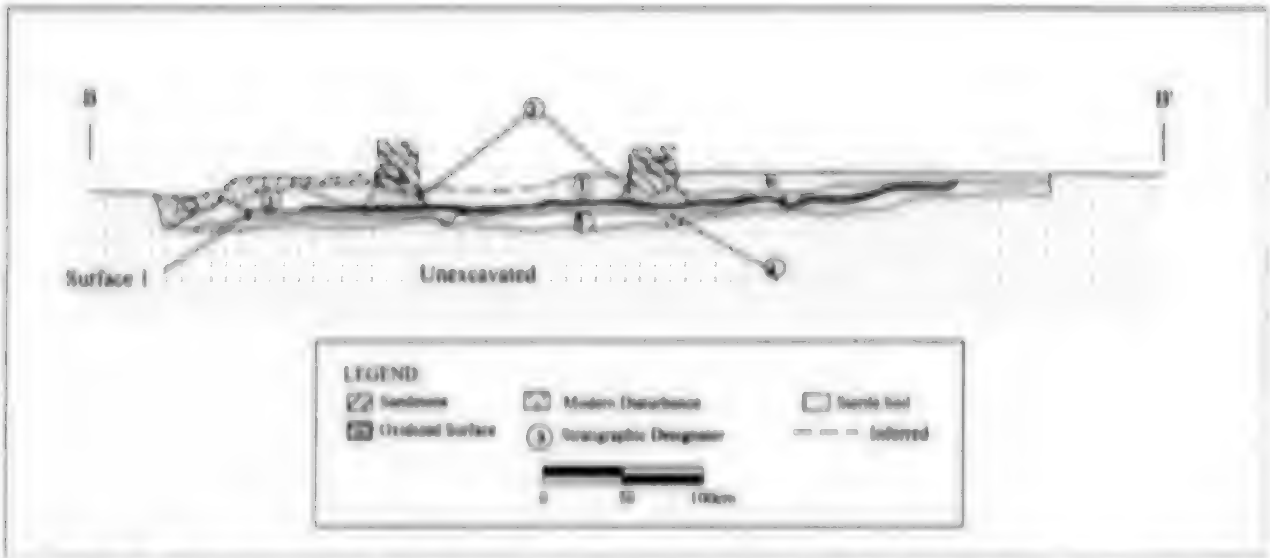


Figure 7.9. Profile view across Site 5MT11706, reference plan map (Figure 7.5) for location of profile.

Polished White jar sherds usually indicate a site dating to the Basketmaker III - Pueblo I time period ca. A.D. 575-900 (Flint 1994:2). This seems inconsistent with the Pueblo II architectural style at this site. However, an explanation for this anomalous situation is possible when the sites in the surrounding are considered. Within 50 m of Site 5MT11706 and uphill there were two habitation sites which had similar ceramic assemblages.

Faunal Bone

The faunal assemblage from Site 5MT11706 consisted of three bones (Rood 1994). There was an axis fragment of *Odocoileus hemionus* (mule deer) which was longitudinally fractured and appeared to have been broken when "green." A portion of a *Lepus sp.* (jackrabbit) pelvis including the ilium and acetabulum was also present. There was a clear break where the jackrabbit ischium was separated from the remainder of this pelvis which "is a common break noted in the leporoid pelvis elements among Anasazi faunal assemblages. Breaks of this type are made when removing the femur (upper leg) from the axial skeleton" (Rood 1994:3). All of these food scraps were found on the prehistoric surface created when the building site was leveled. They may represent food consumed by the people preparing the building area and may or may not have been cooked in Feature 1.

Dating of Site 5MT11706

The style of the two extant walls was the most significant evidence for site dating since the small ceramic assemblage appeared to be intrusive from two earlier sites uphill from 5MT11706. True coursed masonry does not appear in the project area prior to around A.D. 890. Although it is true that in many of the larger late Pueblo I villages coursed masonry interspersed with vertical slab jacal construction is not uncommon; coursed masonry employed as the only construction method does not become the standard until after A.D. 900 in the Mesa Verde region (Brisbin et al. 1985). The masonry style exhibited by these walls although fairly crude, was true horizontal coursed masonry. There was none of the shaping by pecking and grinding commonly found in late Pueblo II or Pueblo III structures, and the stones in these two walls were an admixture of both block and tabular pieces of sandstone. These data indicate that the time of construction of Site 5MT11706 was during the Early Pueblo II period. A counter argument to this scenario is that we are only looking at the two lowermost courses which may have been hidden if construction had been completed. Based upon the architectural elements, Site 5MT11706 was probably built at some point after A.D. 900.

Interpretation of Prehistoric Preconstruction Site Preparation at 5MT11706

Perhaps the most interesting aspect of 5MT11706 was that the initial efforts to prepare the pueblo site location, prior to actual construction, were not obscured by subsequent habitation. Four steps were identified from the archeological evidence. First the area was cleared of brush and leveled. Apparently when the brush was removed and the area leveled, a single juniper or pinyon was left in place in the area where the front rooms were to be built. The second step in preparing the site location was to remove this tree by burning it. The intensity of the resulting fire scorched the earth leaving an oxidized area on the archeological site. After the tree was burned, the stump was removed but the partially burned roots of the tree were left behind since they did not extend above the prepared surface. The third step in the process of preparing this prehistoric site was to build a berm of soil (Stratum 3) along the length of the pueblo where the western (back) wall was to be built. The very fact that this berm was built indicated that the prehistoric inhabitants were aware of the flood potential of their chosen house site. The final step prior to the erection of the walls was to build two parallel earthen dikes which were to act as a foundation beneath the masonry walls (Stratum 2).

This seemed to be a rather odd sort of strategy for building a foundation, but there seemed to be a logical explanation. When the building site was leveled, most of the earth moving activities took place on the gray silty clay along the edge of the flood plain. Only along the eastern one third of the site was the more stable, eolian deposited loess encountered. Unlike the Mancos Shale derived soil of the flood plain, this eolian soil has a fairly high clay and sand content and does not immediately become a slurry upon contact with moisture. Without the clay and sand foundation, the two constructed walls would have been directly on the flood plain deposits. The future occupants might have felt it desirable to build their walls on top of soil that would not dissolve as soon as it became damp. Once the walls were constructed, a pad of this same loess soil was applied between the walls and on top of the flood plain stratum to create an excellent occupation surface.

The single constructed feature found on this site was probably built while the site preparations were underway. Feature 1 was a roughly circular hearth that may have been used to heat food for the construction crew and not intended as a permanent feature.

Summary and Conclusions for Site 5MT11706

Site 5MT11706 was destined to be a Pueblo II habitation site but the more interesting story was why the pueblo was never finished and construction was abandoned after only the first courses of two walls were laid. The evidence for periodic flooding in the area is substantial. The building site was situated on the very edge of a flood plain. The builders, being aware of this problem, actually built a berm or dike along the west side of the roomblock. The two walls that were constructed were raised on a pad of adobe clay instead of being built on the more unstable flood plain deposits. There may be other reasons for abandoning the project but problems with flooding are based on the physical evidence present. The builders may have moved their construction activities to Site 5MT11667 a Pueblo I/Pueblo II habitation site less than 100 m to the southeast. Site 5MT11667 is situated on higher ground, well above the flood plain and is comprised of numerous masonry rooms, one kiva and a midden area to the south.

Site 5MT11728, Anasazi Jacal Structure

Site 5MT11728 consisted of a single isolated jacal structure apparently affiliated with an Anasazi cultural group. It was discovered along the main pipeline corridor 1.7 km south-southwest of 5MT11706. There was a Pueblo II habitation site approximately 100 m to the south of this isolated unit but affiliation and/or contemporaneity could not be established. This jacal unit was abandoned for an unknown period of time before it was destroyed by fire.

Site 5MT11728 was located in the Montezuma Valley at an elevation of 2015 m (6610 ft) in Section 1 of Township 35 North, Range 15 West on a fairly broad alluvial plain, which drains to the northwest towards McElmo Creek drainage system. The most prevalent vegetation in the area is *Artemesia tridentata* (big sagebrush) and *Atriplex canescens* (four-wing saltbush). Both *Juniperus utahensis* (juniper) and *Pinus edulis* (pinyon pine) trees are present but appear as isolated trees or in small clusters. Today the area is used as winter pasture for both cattle and sheep. It also serves as winter range for *Odocoileus hemionus* (mule deer). There were no surface indications of this site. It was discovered during routine monitoring of the pipeline trench excavation and appeared as a slightly oxidized stain on the north wall of the trench. Cleaning of the trench wall revealed the profile of a basin shaped room which had apparently burned at some point after its abandonment.

Methodology at Site 5MT11728

First, a 4-x-4 m excavation block was established over the structure (Figure 7.10). Next a test trench 50 cm wide was excavated east to west across the structure to determine its lateral extent as well as its depth. Once the nature of the cultural deposits was determined, the overburden of post abandonment soil within the 4-x-4 m excavation block was removed as a unit in order to define the horizontal extent of the structure. This stripping action revealed that only one room, which was designated Room 1, was present in the study unit. All fill within the room was removed by natural and cultural stratigraphic levels and passed through 1/4 inch mesh for artifact recovery. Samples of carbonized material were collected for species identification and pollen samples taken from selected areas of the prehistoric use surface.

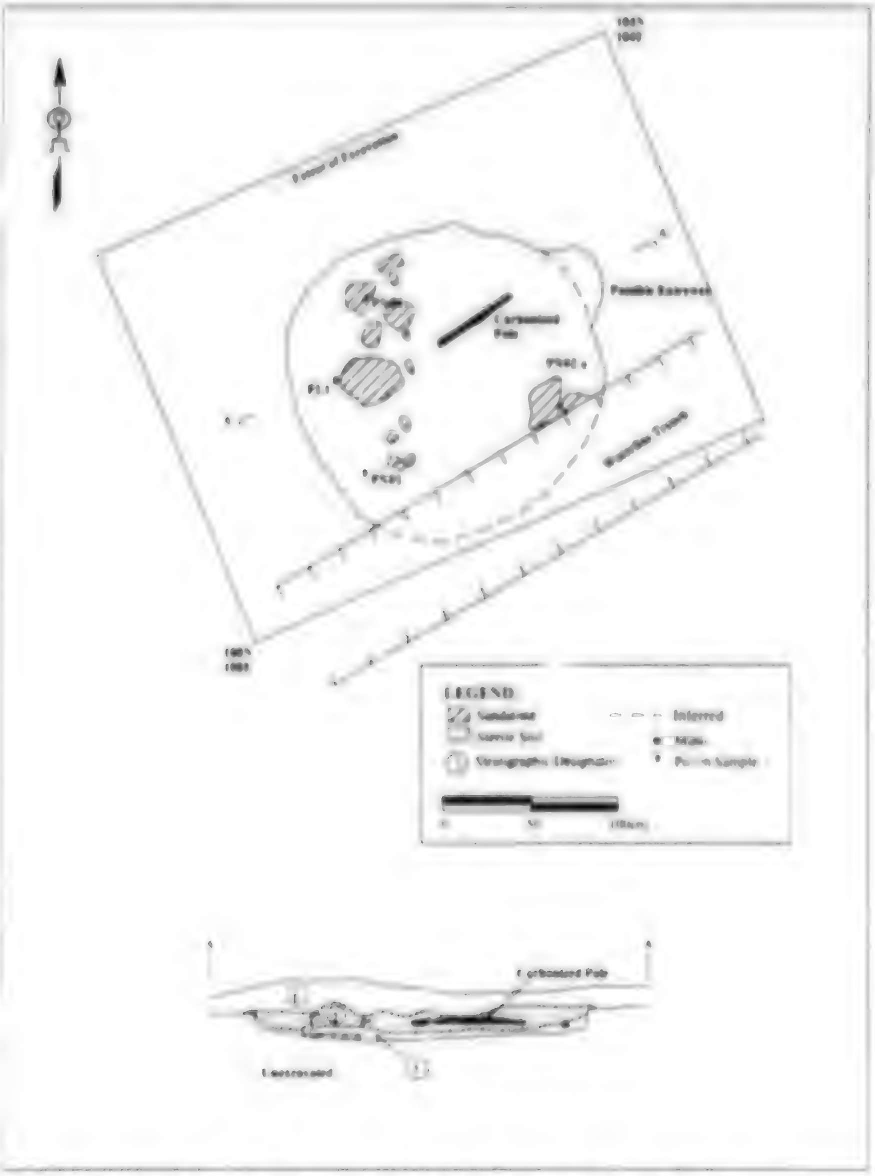


Figure 7.10. Site plan and Structure 1 profile at Site 5MV11728.

Architectural Description for Site 5MT11728

Room 1 was the only structure at Site 5MT11728. It was roughly circular in plan view with a slight extension on the east that may represent the locus of an entryway. In profile the room had a flat, level, use-compacted surface that curved sharply upward towards the base of the walls. Approximately the southern 40 cm of the room was removed by the pipeline trench. The room was 1.9 m east-west, approximately 1.4 m north-south with a floor area of 2.95 m^2.

Prehistorically the room had been excavated into the native soil an average of 12 cm. There were no discernible post holes around the periphery of the room which may indicate that the superstructure was of fairly light construction. Only the fragments of carbonized poles and burned daub in the fill of the room gave an indication that the room was enclosed at all.

The floor in this structure was simply the use-compacted surface of the excavated pit. The surface had not been plastered or augmented in any other manner other than compaction by use. The floor surface was devoid of any constructed features with one possible exception. In the central section of the east wall there was a concavity that projected 20 cm to the east. This concavity was 50 cm wide by 20 cm deep and could mark the locus of the entry into this structure or could have been caused by post abandonment erosion.

Material Culture at Site 5MT11728

A single ground stone artifact (PL1) was the only cultural item lying on the floor of Room 1. This was an unshaped, two-hand, sandstone mano. There were no ceramics or flaked lithics associated with the prehistoric surface.

The rest of the material culture inventory consisted of a single ceramic sherd found in Stratum 2 intertwined in the roots of a sagebrush. This was an undecorated body sherd from a whiteware jar with sherd temper. Sherd tempered whitewares in this region occur most consistently in sites dating between A.D. 900 and 1300.

Stratigraphy at Site 5MT11728

There were three strata associated with Room 1. Stratum 3 was an alluvial post-abandonment deposit which was directly on top of Surface 1. It was a homogenous gray silty clay containing only natural inclusions such as roots and an occasional small piece of Mancos Shale. This stratum washed into the structure after abandonment while some of the superstructure was still standing. When the remnants of the superstructure burned they were deposited on top of Stratum 3 and were designated as Stratum 2. This stratum was characterized by an overall matrix of gray loamy clay much like Stratum 3. Mixed throughout this matrix were burned remnants of the superstructure that at one time had enclosed Room 1: pole fragments, sagebrush, oxidized soil, and numerous pieces of oxidized tabular sandstone. The positions of the sandstone indicated that most of this construction material had been employed along the west side of the structure. Slabs incorporated into Basketmaker III and Pueblo I jacal structures are a common trait and is was not surprising to find them in this structure (Brisbin 1985). Stratum 1 was a natural post abandonment deposit that not only covered Room 1 but also the entire basin area where Room 1 stood. It differed from Stratum 3 only in that its uppermost margin had a high organic content derived from the vegetation surrounding the site.

Pollen Analysis Results from Site 5MT11728

Four pollen samples were collected from the surface of Room 1, three of which were analyzed (Holloway and Rhodes 1994). Sample 1 from the southwest corner of the structure contained primarily *Pinus* (Pine), *Chenopodiaceae* (goosefoot), *Amaranthus* (pigweed), and *Artemisia* (Sagebrush) pollen. Sample 2 taken from the southeast corner of Structure 1 contained mostly *Pinus*, *Chenopodiaceae*, and *Amaranthus*. Sample 3, taken from a general Surface 1 provenience was so degraded that none of the pollen grains could be identified. Identified in the samples from Site 5MT11728 in lesser amounts were *Asteraceae* high spine group (Composite family, yucca), *Ephedra* (Mormon Tea), and *Platyopuntia* (prickly pear cactus).

This pollen profile reflected the vegetative pattern which dominates the area today and probably did prehistorically. The lack of any form of cultigen suggested that this structure was probably not used as a storehouse for domesticated crops.

Dating Samples at Site 5MT11728

The few carbonized poles found in Stratum 2 were all to fragmentary and/or rotted to be suitable for tree-ring dating purposes. Likewise the oxidized soil also found in Stratum 2 was too disturbed to be useful for archaeomagnetic dating. Radiocarbon samples were collected but not sent for analysis because it was thought that the structure could be more finely dated based on its stylistic attributes.

Summary and Conclusions for Site 5MT11728

This small isolated jacal unit which comprised site 5MT11728 was a bit of an enigma. Stylistically the jacal construction is characteristic of the Basketmaker III and Pueblo I period (A.D. 450-900). In opposition to this chronological assessment, the single ceramic found in the roof fall stratum would place the site into the A.D. 900-1300 temporal bracket although sherd temper is sometimes found in Pueblo I ceramics. It is probable that this ceramic sherd was intrusive into the site and originated from a Pueblo II habitation site located 100 m uphill. However, the temporal placement of the site is still uncertain because jacal construction is present in Pueblo II/III structures in the Mesa Verde Region at the Yellowjacket Site 20 km to the northwest of the study area.

The actual purpose of this structure was also unclear. The pollen record from the floor of Room 1 strongly suggests that neither cultigens nor any other wild produce was collected and stored in this room. The single mano found on the floor may indicate that tools related to agriculture were stored in the structure. Structure 1 at Site 5MT11728 was an isolated jacal structure built at some point between A.D. 450 and A.D. 1300 for a purpose not readily apparent.

Site 5MT11729, Oxidized Pit Feature

Site 5MT11729 consisted of a large oxidized pit feature of uncertain cultural affiliation. The original Mesa Verde Water Line trench bisected the feature removing much of the central portion. This feature had the characteristics of an aboriginal construct, however there were no artifacts found within the feature which could tie it into a temporal framework.

Site 5MT11729 was located in the lower foothill region of the north escarpment of Mesa Verde at 2088 m (6850 ft). The top of the escarpment reaches an elevation of 2438 m (8000 ft), directly above the site. The vegetative pattern in this area is pinyon-juniper woodland with a sparse understory of shrubs and grasses. To the south the land drops away on a moderate grade, but immediately to the north the topography rises steeply to the base of the cliffs which form Mesa Verde's escarpment. The soils in this area are predominately derived from decomposed Mancos Shale with a colluvial admixture of the Point Lookout Sandstone.

Methodology at 5MT11729

Site 5MT11729 was originally impacted in the early 1950s when the water line was first constructed through this area. At this time the feature was bisected from south to north. In 1993 during the Mesa Verde Waterline Replacement Project Phase III, the site was excavated. First, the extent of the feature was defined horizontally by following the line of oxidation around its edges, where visible, and tracing the division between cultural and sterile fill. To determine the depth of the feature, the fill of the old pipeline trench was removed to expose the full vertical extent. To determine if the feature was an isolated occurrence or was one of a cluster of features, a 6-x-6 m excavation block was established around the feature and dug down to sterile soil in 2-x-2 m units. In addition, a 6-x-6 m grid pattern was established to the east and 16 auger holes were drilled at 2 m intervals. All fill matrix from the feature itself was passed through 1/4 inch mesh and half of each 2-x-2 m unit outside the feature was screened. Bulk soil and pollen samples from primary deposits within the feature were also taken.

5MT11729 Feature 1 Description

Feature 1 at Site 5MT11729 was roughly oval in plan view and formed a steep sided basin in profile (Figure 7.11). The dimensions east to west were 1.3 m and north to south 1.13 m. Its greatest existing depth was 25 cm at the north end. It is possible that at one time the walls may have been lined or at least partially lined with vertical slabs of tabular sandstone. Three such slabs, still in situ, were found at the extreme eastern side of the feature. This area of Feature 1 was found on the east side of the old waterline trench. A swath

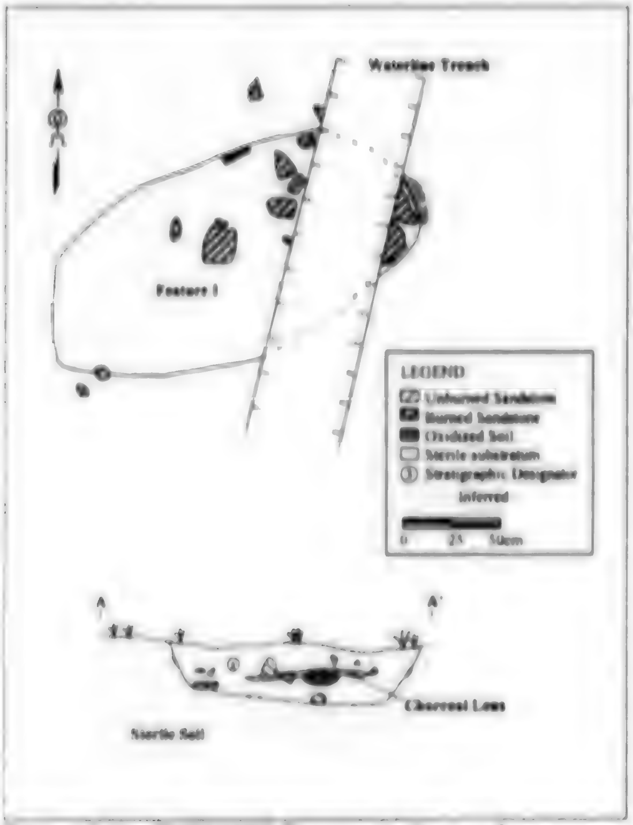


Figure 7.11. 5MT11729 Feature 1 plan and stratigraphic profile.

40 cm wide to the west of this segment was destroyed by the original pipeline trench. There were a few patches of oxidation on the walls of the pit where no slabs were in place.

Site 5MT11729 Stratigraphy

There was a single stratum in Feature 1 of a natural matrix of a silty brown clay loam alluvial deposit with cultural inclusions of oxidized stone and charcoal lens. After the feature was abandoned it began to gradually fill naturally. Since the north end was the deepest and downhill part of the feature, it filled with alluvial sediments first. After approximately 12 cm had accumulated in this area the feature was apparently reused. This reuse was indicated by the presence of a charcoal lens and the appearance of a large amount of oxidized, blocky, sandstone fragments in the fill. These fragments were not present below the charcoal lens and were prevalent in the upper fill as well as out on the ground surface around the rim of the feature.

Material Culture at Site 5MT11729

With the exception of two ceramic sherds there was no material culture recovered at this site. The two sherds were recovered from the upper fill of the 6-x-6 m excavation block and could have been deposited at any time after the site was abandoned and Feature 1 filled. The ceramics were both Gray Body Jar sherds with crushed igneous temper. The temper identifies them as locally made and the smooth gray body sherds could have been made at any time between A.D. 575 - 1300.

Pollen Sample from 5MT11729

One pollen sample taken from the charcoal lens in Feature 1 was processed with poor results. (Holloway and Rhodes 1994). *Pinus* (pine), *Chenopodiaceae* (goosefoot), *Amaranthus* (pigweed), High Spine *Asteraceae* (Composite family), and *Artemisia* (sagebrush) were identified in low concentrations. Of the total pollen concentration value of only 283 grains/gm, 40% of the pollen was not identifiable.

Summary and Conclusions on Site 5MT11729

Feature 1 at Site 5MT11729 was a large pit feature that was used in conjunction with fire. The feature had been abandoned once and at an unknown time reused. There were no artifacts associated with Feature 1 to indicate either function or chronological date. Feature 1 could have functioned as food processing pit. Unfortunately the pollen analysis did not help to substantiate or refute this hypothesis. That the feature was of prehistoric manufacture is fairly certain but by whom and for what purpose is unknown.

Site 5MT10595, Pueblo II Multicomponent Habitation

Site 5MT10595 was a multicomponent Pueblo II habitation site (Figure 7.12). The remains of the first component (Component 1) consisted of a hearth (Feature 3, Room 5) and a 1.4 m^2 area of masonry rubble in the northeastern portion of the site. The primary component (Component 2) consisted of five rooms and a kiva. Three extramural features (Features 1, 2, and 4) were associated with the site. 5MT10595 was located in Section 15, Township 35 North, Range 15 West at 2094 m (6870 ft) in the pinyon-juniper woodland that blankets the foothill region below Mesa Verde's north escarpment. This area is characterized by deeply incised water courses which have cut into the colluvial deposits that have collected at the bottom of the escarpment. The parent material for these colluvial deposits derives from the Point Lookout Sandstone which forms the cliffs of the north escarpment (C7D Sideshow-Zigzag).

Methodology at Site 5MT10595

Site 5MT10595 was extensively tested over two field seasons. In 1992 the Midwest Archeological Center recorded the site and conducted limited testing to determine the size and cultural complexity because of the proximity to the Mesa Verde Waterline right-of-way. In 1993 the Bureau of Land Management requested further work be done which was accomplished by the Mesa Verde Waterline Replacement Project Phase III archeological staff.

During the initial testing in 1992 a grid system was established across the site which encompassed the main area of rubble. This grid system encompassed what later became Rooms 1, 2, and 3. A surface artifact collection was made and the forest duff stratigraphic level was removed to expose possible wall alignments. A north-south test trench was excavated through the

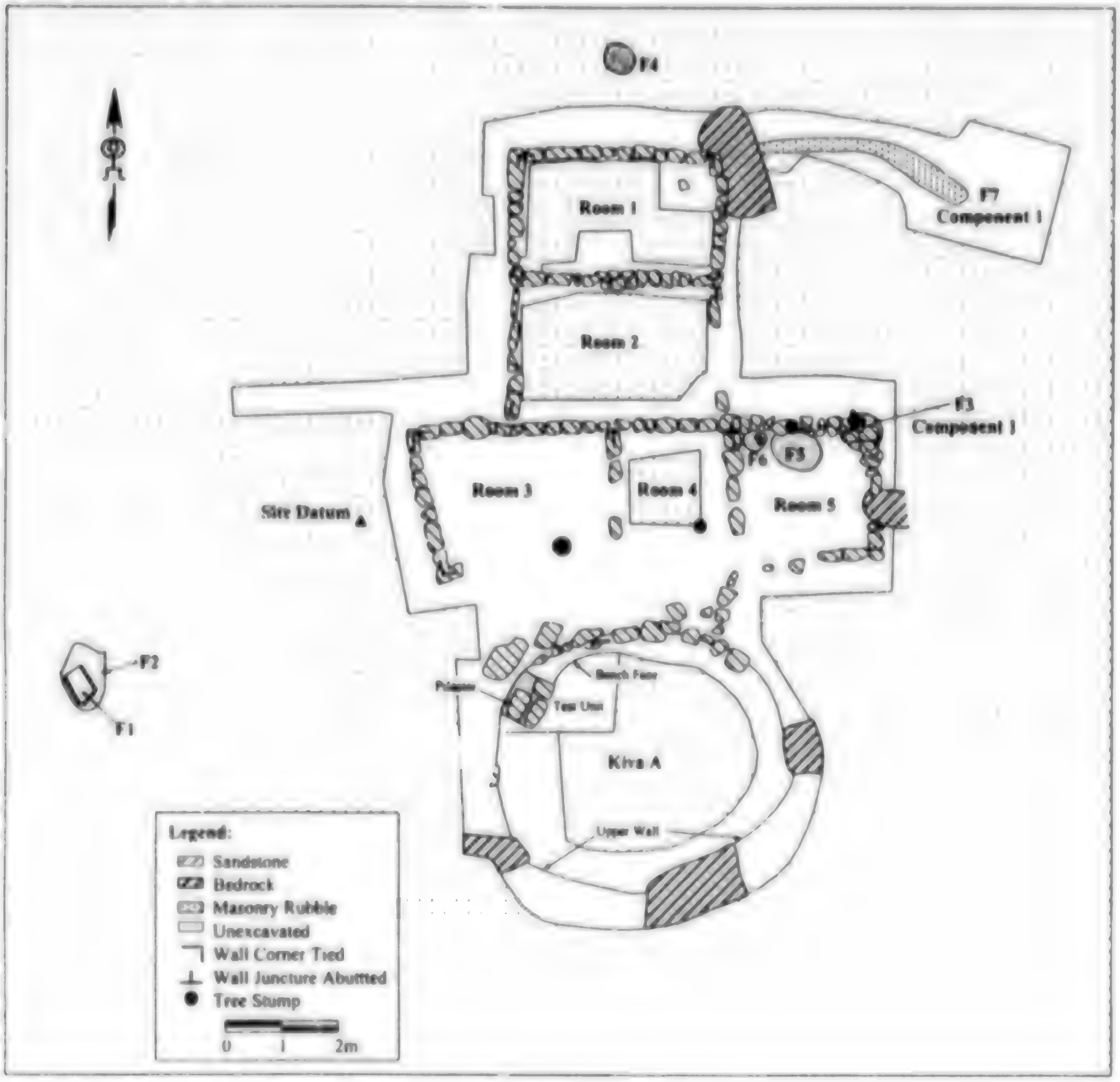


Figure 7.12. Site plan of 5MT10595.

center of the site which defined the central portion of the north and south wall of Room 1 and a portion of the north wall of Room 4. Test trenches revealed several extramural features (referred to in this report as Features 1, 2, and 4), and samples were collected from one feature (Feature 4). Site 5MT10595 was then backfilled until the following field season.

In 1993, Site 5MT10595 was reopened at the request of the Bureau of Land Management in order to gain additional information about the site and to establish the presence or absence of a kiva to the south of the room block area. First, the limits of the roomblock area were defined to determine how many rooms were within these exterior limits. Test trenches were dug 50 cm wide beginning on the exterior north side of the rubble. Once the face of the exterior north wall was defined the wall was simply followed to the west and east until the entire exterior of the roomblock had been exposed. Next the interior partition walls were defined in much the same manner.

This excavation revealed the presence of five surface rooms and the fact that earlier deposits were present along the east side of the roomblock. With the roomblock configuration exposed the location of the suspected kiva could be predicted to the south. This area was tested and it was fairly quickly established that such a structure was present. Again a test trench was used to follow the upper wall in order to determine its size and shape.

At this point it was determined that additional work was needed to clarify room function, the depth, and stratigraphic complexity of the kiva and rooms, and more knowledge of the earlier component located along the east side of the latest roomblock area. To accomplish these goals within the limits of allotted time and budget it was decided that a combination of test pits and total excavation would be employed.

A 1-x-1 m test pit was dug to the floor in the northeastern corner of Room 1. Room 1 was selected because clarification about wall tie or abutment was significant in this corner of the roomblock. At the same time, a 2-x-2 m excavation unit was selectively placed in northwest quadrant of the kiva so that it would encompass both interior and exterior aspects of this area of the kiva. This approach gave both architectural information as well as the stratigraphic history of the kiva.

At the northeast corner of the roomblock, during the initial wall tracing, an alignment of stone running to the east suggested an earlier wall was present. It was decided that following this alignment would probably produce information on the earlier component. Finally, the configuration of the roomblock itself determined the area for total excavation. Generally the smaller rooms are found along the back of a roomblock and the larger rooms representing habitation rooms are adjacent to the courtyard area. In this case however the roomblock configuration resembled an upside down Coptic cross; with the two large rooms forming the long axis of the cross to the north and three smaller rooms forming the arms to the south. Therefore, the decision was made to fully excavate one of the small rooms (Room 5) to determine its function.

All units were excavated by natural and cultural strata and where it was deemed appropriate the matrix was passed through 1/4 inch mesh. The artifacts recovered from test units outside of the exterior walls were recorded with their specific test unit area and appropriate stratigraphic level. Items recovered from the interior test units were recorded with the specific structural unit from which they were recovered and by the appropriate strata from which they were recovered. All items recovered from use surfaces were point-located and their spatial location plotted on a plan view map of the structure associated with the surface.

The prime purpose of the excavations at Site 5MT10595 was to determine the extent of the site to know if it would be impacted by the waterline construction along its western edge. As a secondary consideration the excavations were directed to discerning the chronology of the site and its place in the cultural history of the Mesa Verde area. The third consideration in the excavations was to delineate the site morphology to be able to interpret the way in which it reflected the prehistoric social organization.

Room 1, Site 5MT10595

Length: 3.5 m

Width: 2.0 m

Area: 7 m²

Room 1 was the northernmost room of this small T-shaped pueblo. Testing in this room was minimal and consisted of a single 1-x-1 m test unit in the northeast corner. The purpose of this test trench was primarily to clarify the wall construction. It was not clear from the exterior test trench if walls that met in this corner were bonded or abutted. Also it was desirable to know the depth to the floor and the stratigraphic sequence represented by the fill within the room.

Stratigraphy of Room 1 Site 5MT10595

The fill in Room 1, as defined by the single test, consisted of two strata. The uppermost was composed solely of forest duff which was a highly organic layer derived from a juniper tree that was growing within the room. Below this and down to the floor surface was a tan silty loam interspersed with charcoal flecks and small pieces of sandstone ranging in size from one to 6 cm.

The fill appeared to be material deposited as the pueblo fell into ruin after abandonment. It appeared that construction material was salvaged by the occupants and removed to be used elsewhere. At the time of excavation the highest portion of wall remaining in Room 1 was only 3 courses high or 30 cm. Wall fall found within the room and outside was minimal and indicated that no more than two additional courses of stone had been present prior to excavation.

Architecture and Floor of Room 1 Site 5MT10595

All of the walls of Room 1 were constructed of single coursed, rough shaped, tabular sandstone masonry. The four corners were bonded indicating the room was built as a single unit. The floor in this room was built on top of natural colluvial deposits consisting of gravels and pebbles in a yellowish clay loam matrix. A thin layer of tan silty loam was compacted on top of this colluvial deposit to form a relatively smooth surface in Room 1. The 1-x-1 m test unit in this room uncovered a crushed Mancos Corrugated jar (Figure 7.13). This was the only artifact found on the floor surface in the limited test area of the room.

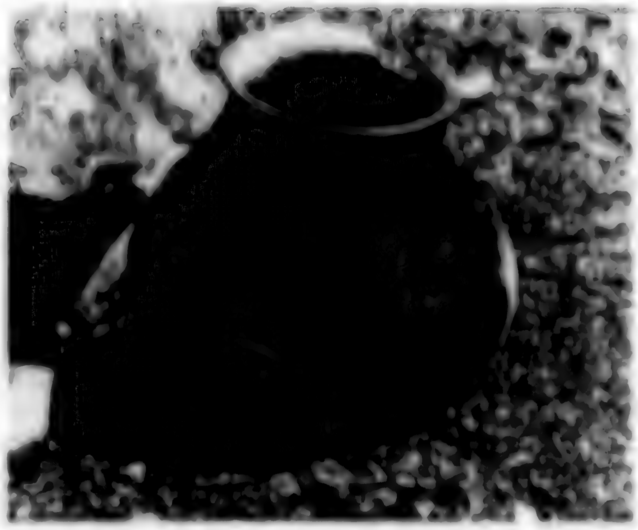


Figure 7.13. Reconstructed corrugated jar from Room 1, Surface 1, 5MT10595.

Function of Room 1 Site 5MT10595

With such limited testing it can only be suggested that Room 1 was a living room. This judgment is based solely on the large amount of floor space (7 m²) suggested by the room dimensions.

Room 2 at Site 5MT10595

Length: 3.5 m

Width: 2.3 m

Area: 8.05 m²

Room 2 at Site 5MT10595 abutted Room 1 along its south wall. Other than removing the post abandonment overburden and defining the wall lines no further work was done in this room.

Architecture of Room 2 Site 5MT10595

Room 2 at Site 5MT10595 was formed by simply constructing two walls which extended north to south between Room 1 to the north and Rooms 3 and 4 to the south. These walls formed the east and west walls of Room 2. The north and south walls were already provided by Rooms 1, 3, and 4. The basal portions of the west and east walls of Room 2 were constructed of both horizontally coursed masonry and vertical slabs. The walls were butted against the already existing walls of Rooms 1, 3, and 4 indicating that Room 2 was built after these rooms were in existence and was probably the last structure built at the site.

Room 3 at Site 5MT10595

Length: 3.2 m

Width: 2.2 m

Area: 7 m²

Room 3 was the westernmost of the three front rooms which faced onto the courtyard area and Kiva A. Other than wall line definition no additional testing took place in this room.

Architecture of Room 3

The west, north, and east walls of Room 3 were all constructed of single coursed horizontal masonry. At the south end of the west wall a tied corner existed that might have been the remnant of a south wall. This segment of south wall extended to the east for 60 cm where it came to an abrupt halt. Beneath the eastern-most stone in this wall segment there was 20 cm of fill remaining above the courtyard surface and the floor level of the room.

The northwest and southwest corners of Room 3 were bonded and the north end of the east wall abutted the north wall. Having interior partition walls that abut, rather than tie into the exterior walls of a room is a common trait of Northern San Juan Anasazi roomblock construction. The north wall of Room 3 was a common wall shared by Rooms 3 ,4, and 5 which were built as a single unit.

Room 4 at Site 5MT10595

Length: 1.75

Width: 1.85

Area: 3.24 m²

Room 4 was the central of the three contiguous front rooms and was also the smallest room of Component 2 at Site 5MT10595. This small room had no discernable south wall. Other than defining wall lines no additional work took place in this room.

Architecture of Room 4

The west, north, and east walls of Room 4 were shared walls. The west wall was shared with Room 3, the north wall with Room 2 and the east wall with Room 5. All walls were of single coursed, roughly shaped, horizontally laid, sandstone masonry. The room was formed by simply adding a single partition wall and butting it against the north wall which was shared between Rooms 3, 4, and 5. Whether this room was added after initial construction to subdivide Room 3 or was part of the initial design is not clear from the available evidence.

Room 5 at Site 5MT10595

Length: 2.3 m

Width: 2.2 m

Area: 5 m²

Room 5 was almost square and was the easternmost of the three front rooms. Room 5 had a single use compacted surface which in turn rested upon cultural fill derived from the first occupation of 5MT10595, Component 1. There were three features found within Room 5. Two of the features were associated with the floor surface. The third feature was a hearth associated with the Component 1 occupation of 5MT10595. The walls which made up the northeast corner Room 5 were built across the earlier hearth, Feature 3 (Figure 7.14).

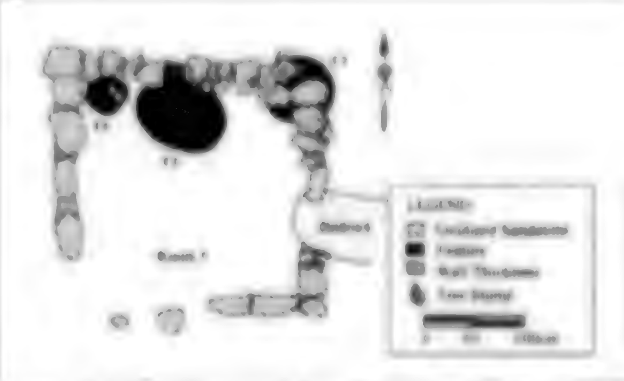


Figure 7.14. Plan map of Room 5 at Site 5MT10595.

Figure 7.15. View of 5MT10595 Room 5, Surface 1, looking North

Architecture and Surface 1 of Room 5

Room 5 had a south wall although only the basal course of this wall remained. The extreme south end of the west wall as well as the extreme west end of the south wall were missing. A short diagonal wall alignment located between the missing corner and the northeast edge of Area A was a fairly good indication that at one time a southwest corner was present in Room 5.

All walls in Room 5 were constructed of single coursed, horizontally laid, roughly shaped, tabular sandstone masonry. The west wall was abutted against the north wall and was shared with Room 4. The east wall incorporated a natural sandstone boulder near its south end. Because of prehistoric salvage, natural erosion, and the presence of a pinyon tree, the nature of the wall bases or abutments in all but the northwest corner could not be determined.

Surface 1 in Room 5 was a rather uneven and compacted surface built on top of colluvial fill associated with Component 1 (Figure 7.15). Three features were found on the floor of Room 5. Features 5 and 6 were associated with Surface 1 of Room 5. Feature 3 was a hearth which represented an earlier (Component 1) surface over which the northeast corner of Room 5 was partially built.

Feature 3 in Room 5, Hearth

Feature 3 was not excavated, but its outline could be traced by an oxidized rim both inside and outside of Room 5. In plan view the feature was circular with a diameter of 70 cm. It was located between 4 to 5 cm below Surface 1 of Room 5 in its northeast corner. About one third of the feature extended into the room, one third was under the walls of Room 5, and one third was outside the exterior walls. By its size, shape, and location Feature 3 appeared to have been an unlined hearth associated with Component 1 of 5MT10595.

Feature 5 in Room 5, Hearth

Feature 5 in Room 5 was a large oval unlined hearth built into the floor surface of Room 5. This feature was 82 cm in length by 65 cm in width and was 10 cm deep (Figure 7.16). The depth given is the depth at detection however, an estimated 6 cm was lost before detection due to massive root action in this area of the floor.

Feature 5 had been constructed against the central portion of the north wall. The rim of the feature was heavily oxidized but greatly disturbed by root action from a pinyon tree growing out of the north wall directly above the feature. The feature was basin shaped with steep sides in profile and contained a lower lens of primary fill which was superimposed by a post abandonment deposit which encompassed the entire room. There were no artifacts in association with the primary fill of this feature.

Feature 6 in Room 5, Storage Pit

Feature 6 was constructed in the northwest corner of Room 5. The feature had a circular plan view and a steep sided basin profile. A thin vertical sandstone slab was used to form its western wall and a large Mancos Corrugated jar fragment was used to form the southwestern corner. In the juncture where the slab and sherd met, a hammerstone was found. This hammerstone was located near the bottom of the feature pressed into the sidewall. Feature 6 was 42 cm in length by 40 cm in width and 22 cm deep.

The fill within Feature 6 was a soft dark brown silty loam interspersed with charcoal flecks. Resting on the bottom of the feature were two fist sized oxidized sandstone cobbles. This feature had the appearance of a small storage pit and the fill sequence indicated that it was open at the time of abandonment and eventually filled by natural processes.

Function of Room 5 Site 5MT10595

The storage pit and the presence of a hearth suggested that Room 5 probably functioned as either a habitation room or perhaps a multifunctional work room. With 5 m² of floor space and the total lack of artifacts

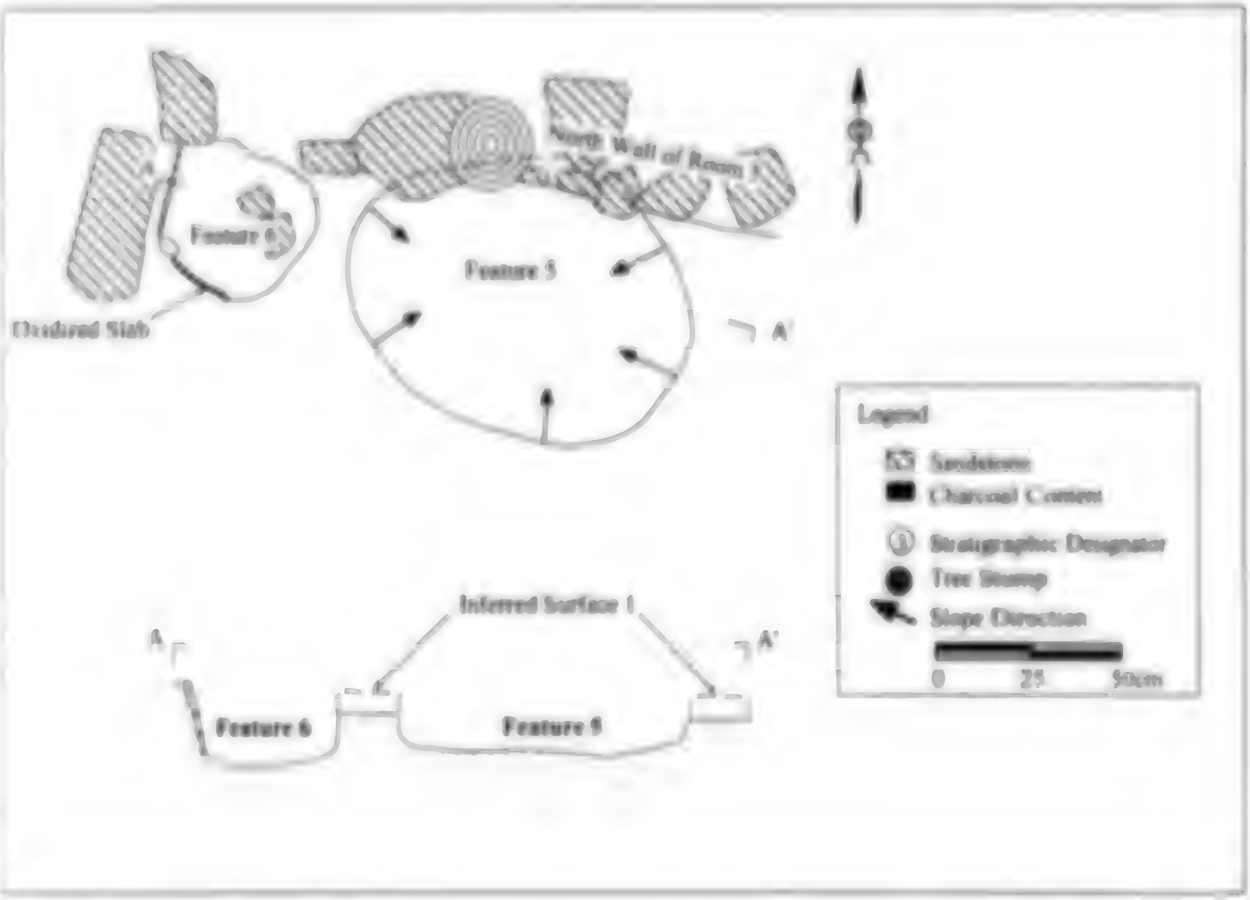


Figure 7.16. Plan and profile views of Features 5 and 6 at 5MT10595.

on the floor, the multifunctional work room concept seems more likely than a habitation room.

Kiva A at Site 5MT10595

Length: 5.1 m

Width: 3.85 m

Depth: 2.15 m

Kiva A at Site 5MT10595 was located in the courtyard area less than 2 m south of Room 4. It was physically tied to the roomblock by a short diagonal wall which ran from the northeast perimeter of the kiva and connected to the southwest corner of Room 5. At the time of excavation only the foundation stones of this wall were still in situ.

Kiva A was oval in plan view. In the area of Kiva A, the builders encountered four sandstone boulders that were too large to move and therefore had to be incorporated as part of the structure. The faces of these boulders thus determined the shape of the kiva.

Architecture and Floor Surface of Kiva A

Since work at this site was designed as a testing program rather than full scale excavation, Kiva A was not fully excavated. The circumference of the kiva was defined by uncovering the upper walls and a single test pit was excavated in the northwest quadrant to determine depth, stratigraphy, and internal construction. The test pit was a 2-x-2 m non-grid unit situated in such a manner that it would fall partly within the structure and partly outside the upper wall. The kiva had a bench 1.4 m above the floor surface. In the test pit, the bench ranged in width from 20-55 cm. The bench was widest in the south portion of the kiva due in part to a shelf of bedrock in the area. There was a masonry pilaster 85 cm wide and 60 cm thick built on top of the bedrock shelf. Only the basal portion (lowermost 2 courses) of this pilaster was still intact. The upper portions had, through time, slumped into the fill that was gradually filling the structure. The narrow part of the bench was simply a shelf cut into the native colluvium. Enough evidence remained to indicate that the bench surface or at least its leading edge had been lined with a single course of masonry. The face of the bench was not faced with masonry, it was simply colluvium with a coat of plaster applied. This plaster was still intact from the floor up the wall to a height of 50 cm. The upper walls of the kiva above bench level were badly eroded but in places there was still rough masonry in situ.

A single floor surface was found in Kiva A. The same plaster that was used to cover the bench face was extended out across the floor directly on top of the native colluvial deposits. This produced a fairly smooth floor surface though a bit bumpy in spots. In the segment of floor exposed by the test pit there were no features, nor floor artifacts.

Stratigraphy of Kiva A

There were six definable stratigraphic units in Kiva A (Figure 7.17). The deepest layer, Stratum 6, was a thin layer of eolian deposited silts intermixed with fluvial sands and lightly sprinkled with charcoal bits. The overall matrix of the next layer, Stratum 5, consisted of a silty loam. Intermixed throughout the Stratum 5 matrix were numerous unburned roof timbers and rotted wood scraps, as well as a few sandstone building stones, charcoal flecks, and artifacts washed in from the surrounding area. Stratum 4 consisted of both eolian and alluvial deposits of silty sand interspersed throughout with building stones from the upper walls. Stratum 3 was a light brown, fine grained, silty sand

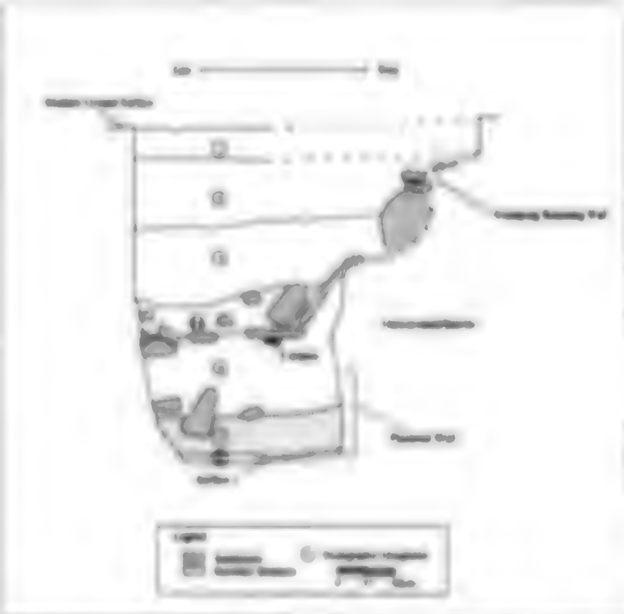


Figure 7.17. Stratigraphic profile of Kiva A, south wall at Site 5MT10595.

with frequent fragmentary sandstone inclusions. Interspersed throughout the Stratum 3 matrix were flecks of caliche, with a few ceramic sherds. The caliche flecks were found throughout Strata 2, 3, and 4. Stratum 2 was predominantly an eolian deposit of brown silty loam. However, interspersed throughout the Stratum 2 deposit there were finely sorted lenses of silt that were deposited by alluvial action. Stratum 2 also contained a large quantity of both burned and unburned fragments of sandstone not exceeding 2 cm in diameter. Stratum 1, the uppermost deposit, was a silty brown loam identical to Stratum 2 except that it contained fewer inclusions and had a higher organic content particularly in its uppermost 10 cm.

The stratigraphic deposits indicated that Kiva A was abandoned, fell into ruin, and gradually filled up by natural processes. Most of the structural collapse took place during the formation of Strata 4 and 5. During this period the roof collapsed and much of the masonry veneer above the bench fell inward to add its bulk to the ongoing filling process. At times enough moisture entered the kiva all at one time so that standing water was present. This standing water further weakened the side walls causing additional material to fall into the pit. This whole process was repeated over and over until no further sign of the presence of this subterranean chamber existed.

Features 1 and 2 at Site 5MT10595

Two extramural features (Feature 1, a slab lined box; and Feature 2, a basin shaped pit) were associated with 5MT10595. They were located 6 m west of the room block along the east edge of the Mesa Verde Waterline right-of-way. At the time the original pipeline was buried, the trench for that pipe cut away the easternmost edge of the features.

Feature 1 and Feature 2 were actually a feature within a feature (Figure 7.19). The first feature to occupy the space, Feature 2, was a roughly circular, basin shaped pit, 28 cm in depth by 80 cm in diameter. The floor surface of the feature was oxidized. Shortly after Feature 2 was abandoned a load of burned daub, poles, and oxidized sandstone fragments were dumped into it and the feature continued to silt in without further disturbance. When the feature was filled, a new feature was constructed within its fill.

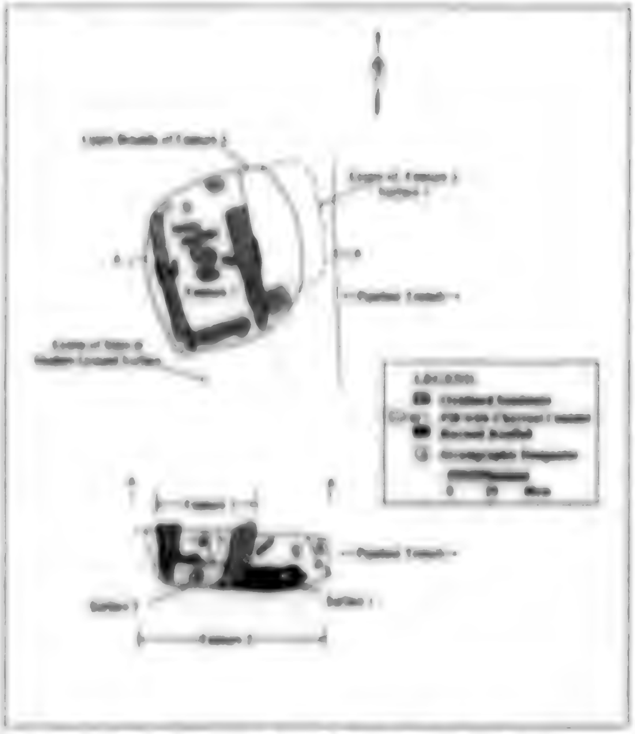


Figure 7.18. Features 1 and 2 at Site 5MT10595.

The later feature (Feature 1) was a slab lined box 60 cm in length by 30 cm wide and 32 cm deep. Three of the four sides were formed by vertically placed sandstone slabs. The north wall was not as distinct. There were two vertical slabs in this area but if they were once the north wall they had fallen forward toward the interior of the feature. The fill of Feature 1 was very similar to Feature 2. The lowermost stratum of this feature consisted of a 10 cm lens of black carbonaceous sand intermixed with oxidized fragments of sandstone. The floor beneath this stratum was oxidized. The oxidized surface was also part of the original floor of Feature 2. The post abandonment fill above the carbonaceous level consisted of charcoal bits and small pieces of sandstone intermixed within a matrix of brown silty loam.

In seems apparent from the nature of the primary fill and the presence of oxidation that both Feature 2 and Feature 1 were thermal features of some type. Macrobotanical remains from Feature 1 contained charred remains of saltbush, juniper, pinyon, and a single corn cupule. These charred remains probably all represented fuel including the corn cupule if a cob was thrown into the fire. Both the features were probably food processing pits or roasting pits.

Feature 4 at Site 5MT10595

Feature 4 was a circular basin shaped hearth located 2 m north of the north wall of Room 1. It had a 65 cm diameter and variable depth. This feature was excavated during the 1992 field season and was originally designated field Feature 1. It was probably associated with the later Pueblo II component (Component 2), based on radiocarbon sample recovered from the primary fill.

Ceramics at Site 5MT10595

A total of 1,817 ceramic sherds, was recovered from both surface and subsurface proveniences at Site 5MT10595 (Table 7.3).

The number and percentage of formal and grouped types from the ceramic assemblage recovered from 5MT10595 reflected an early Pueblo II occupation starting after A.D. 900 and ending around A.D. 1050. Eighty-four percent of the grayware sherds were corrugated. Of these 947 corrugated sherds, 62 (6.5%) were Mancos Corrugated as determined by the attribute of minimal rim eversion (0- 30 degrees). Two Dolores Corrugated rim sherds were found with rim eversion between 30 and 55 degrees. Dolores Corrugated starts to appear in the archeological record ca. A.D. 1050.

Mancos Black-on-white was the predominant whiteware (87%) (113) of the 129 whiteware sherds which could be assigned a formal type. Cortez Black-on-white was also represented in the assemblage with 13 sherds representing 2% of the whiteware assemblage and 10 % of the formal type whiteware. Eight whiteware sherds represented painted corrugated bowls. Six whiteware sherds were manufactured with trachy basalt temper which indicated that they had been manufactured in the Chuska Valley of New Mexico. Other temper types identified were used in local manufacture in the Mesa Verde area including: crushed igneous rock, sandstone, and sherd used alone or in combinations. Five redware sherds were typical of pottery manufactured in southeast Utah.

There was a wide variety of vessel forms in the excavated ceramic assemblage from 5MT10595. There were 869 jars, 231 bowls, four bowl dippers, three pitchers, two jar handles, and one gourd dipper sherd identified in the assemblage. One reconstructible vessel from the floor of Room 1, a Mancos Corrugated Jar, was represented by 91 sherds. The jar would have held about 7 l (7.5 quarts) of food.

Table 7.3. Ceramic Types from 5MT10595

	N	%
GRAYWARE	1120	61.6
Plain Gray Body	131	11.7
Moccasin Gray	1	0.1
Mancos Gray	11	1
Mummy Lake Gray	3	0.2
Corrugated Body	883	78.8
Mancos Corrugated	62	5.5
Dolores Corrugated	2	0.2
Sherd Gray	27	2.4
WHITEWARE	686	37.8
Painted White	1	0.1
Polished White	91	13.3
Polished White Corrugated	3	0.4
Slipped White	53	7.7
Slipped White (Chuska)	3	0.4
Slipped White Corrugated	1	0.1
Sherd White	399	58
Sherd White Corrugated	3	0.4
Sherd White Chuska	3	0.4
Piedra Black-on-white	2	0.3
Cortez Black-on-white	13	1.9
Mancos Black-on-white	113	16.4
Mancos Black-on-white Corrugated	1	.1
REDWARE	5	0.3
Early Pueblo Red	1	20
Bluff Black-on-red	1	20
Deadmans Black-on-red	1	20
Indeterminate Redware	2	40
INDETERMINATE WARE	6	.3

Flaked Lithic Tools at 5MT10595

A total of 70 flaked lithic tools was found at 5MT10595 during the two field seasons (Table 7.4). There were eight core tools, two choppers, an abrader, an asym-

Table 7.4 5MT10595 Flaked Lithic Tool Forms and Material Types

	Abrader	Asymmetrical Biface	Chopper	Core	Hammer-stone	Uniface	Utilized Flake	Total	%
Basalt			1	1				2	3
Chalcedony							2	2	3
Chert				4		1	41	46	66
Limestone				1				1	1
Quartzite			1	2	1		5	9	13
Sandstone	1							1	1
Siltstone		1					8	9	13
Total	1	1	2	8	1	1	56	70	
%	1	1	3	11	1	1	80		

metrical biface, a hammerstone, a uniface, and 40 utilized flakes. Sixteen of the utilized flakes were made from primary flakes and 12 of the 16 were chert. Thirteen of the utilized flakes were secondary flakes and 8 of these were also chert. There were 11 utilized flakes made from tertiary flakes and 9 of these were also chert. Of the 41 pieces of debitage made into utilized flakes 71% were made from chert. In descending order of preference there were 8 utilized pieces of silicified siltstone, 3 quartzite, and 1 chalcedony.

Nonflaked Lithic Tools at 5MT10595

Eleven pieces of nonflaked lithic material were recovered from Site 5MT10595. The ground stone tools were made of diorite, hematite, quartzite, sandstone, and silicified siltstone. Sandstone was the most common ground stone material and accounted for 54% of all tools. The most common tool was the metate represented by four items. The one intact specimen was a slab metate, whereas the remaining 3 were too fragmentary to assign to type. There were three manos found and these also represented three types. There was 1 hammerstone/mano, 1 unshaped one-hand mano and a single unshaped two-hand mano. Two tchamahias were recovered, one made from sandstone and one of siltstone.

Flaked Lithic Debitage at 5MT10595

There were 162 pieces of flaked lithic debitage collected from all proveniences (Table 7.6). There were seven material types represented in the collection, with only chalcedony representing a material that could not be obtained locally. The most common material represented was chert (86 items). Cherts are locally available in the form of small nodules found in old Pleistocene river terraces and from gravels of active streams beds. This material however, appears in small amounts and is usually of poor quality. High quality chert, outcropping in massive beds, is available north of McElmo Creek in the Yellowjacket area. These beds were used extensively by the Anasazi as quarry sites and are located less than 20 km from 5MT10595. Quartzite was the next most common material represented. Outcrops of tool quality quartzites are common in the immediate area of the site (within a 3 km radius). Other mate-

Table 7.5. 5MT10595 Nonflaked Lithic Tool Forms and Material Types

	Hammer-stone/mano	Mano, Unshaped 1-hand	Mano, Unshaped 2-hand	Metate, Slab	Metate, indeterminate	Pigment Stone	Tchamahia	Mano port	Total	%
Diorite	1				1				2	18
Hematite						1			1	9
Quartzite			1						1	9
Sandstone		1		1	2		1	1	6	54
Siltstone							1		1	9
Total	1	1	1	1	3	1	2	1	11	
%	9	9	9	9	27	9	18	1		

Table 7.6. 5MT10595 Flaked Lithic Debitage Forms and Material Types

	Primary	Secondary	Tertiary	Shatter	Total	%
Basalt	3	14	1		18	11
Chalcedony		1			1	0.6
Chert	7	48	24	7	86	53
Hematite				1	1	0.6
Limestone	1	1			2	1
Quartzite	2	42	7		51	31
Siltstone		2		1	3	2
Total	13	108	32	9	162	
%	8	66	20	5.5		

rial types represented were basalt, limestone and hematite.

Faunal Remains from 5MT10595

Six fragments from large mammal ribs and long bones and a single mule deer phalange were uncovered at 5MT10595. Four of the fragmentary large mammal bones were from long bones and two were from ribs. One deer bone (*Odocoileus hemionus*) first phalange was identified from the assemblage. This phalange had been broken in the middle of the diaphysis while "green."

Tree-Ring Dating Sample at 5MT10595

There were three tree-ring samples from Kiva A submitted for analysis. These roof fall samples were from rotted unburned wood and unfortunately did not posses enough rings (fewer than 25) to yield a date. All samples were from *Pinus edulis* (pinyon pine).

Radiocarbon Dating Samples at 5MT10595

A single sample was submitted for radiocarbon analysis from 5MT10595. The sample was excavated from Feature 4, which was the exterior hearth located 2 m north of the north wall of Room 1. The date derived from this sample was 840+/- 60 B.P. (Beta 75288), ca. A.D. 1110 (A.D. 1050 to 1170).

Macrobotanical Samples at 5MT10595

Macrobotanical samples were taken from two hearths at 5MT10595, Feature 5 in Room 5 and Feature 1, the exterior slab lined hearth west of the roomblock.

The sample collected from Feature 5, Room 5, contained an abundance of rootlets, root fragments, and

Table 7.7. Macrobotanical Sample Analysis from 5MT10595

Floral Taxa	Floral Part	Room 5 Feature 5 Hearth	Feature 1A Hearth
Atriplex sp.	wood		Present
Artemisia/ Chrysothamus	wood	Present	
Cleome sp.	seed	1	
Juniperus sp.	wood	Present	Present
Pinus edulis	wood		Present
Zea mays	cupule kernel	2-10	1

unburned bark, indicating bioturbative disturbance (Table 7.7) A single charred *Cleome* (beeweed) seed and several *Zea* (corn) cupules were recovered as well as *Juniperus* (juniper), and *Artemisia/Chrysothamus* (sagebrush/rabbitbrush) wood.

The sample from Feature 1, an extramural hearth, contained an abundance of charred wood fragments. Three types of wood charcoal were identified: *Atriplex* (saltbush), juniper, and pinyon. Also one corn cupule was retrieved. The fill type was considered primary, and as such, the remains represented occupational trash, related to the use of the feature. All charred remains recovered were local to the area, and typical of the pinyon/juniper woodland where the site was located.

Summary and Interpretation of Site 5MT10595

The purpose of excavations at Site 5MT10595 was to determine the extent of the site, determine when the site was occupied, place the site within the cultural history of the area, and delineate site morphology to interpret aspects of prehistoric economy, adaptation, and social organization. It was determined that the main site architecture did not extend into the waterline right-of-way, although a feature associated with the site was impacted by the construction. Architectural data; ceramic typological cross dating; radiocarbon samples; faunal, floral, and macrobotanical samples indicated that 5MT10595 was a two component Pueblo II habitation unit hamlet which was occupied between A.D. 900-1050 by two families.

Architectural Interpretation

The remains of Component 1 at Site 5MT10595 consisted of a 4.5 x 0.3 m east-west trending jumble of fallen masonry (Feature 7) in the northeast portion of the site and a hearth beneath the northeast corner of the second component Room 5.

Component 2 was represented by 5 surface rooms and a kiva. There were three building episodes which were indicated by the wall construction (ties and abutments). Room 1 was built as a discrete unit as indicated by the tied construction of all the room corners. This was probably the first room erected at the site. The second building episode took place when Rooms 3, 4, and 5 were built as a single unit as indicated by the tied construction of all of the exterior corners. The partition walls within this large enclosed rectangular area were all butted to the north exterior wall and could have been added at any time when extra interior rooms were needed. Finally the third construction episode was the addition of two parallel north/south walls which butted to the front wall of Room 1 and to the back exterior wall of Rooms 3,4, and 5. The kiva may have been constructed during the initial building episodes, without tree-ring data the exact period will remain an unknown. The fact that a small stem wall runs diagonally from the southwestern corner of Room 5 to the northeast quadrant of Kiva A indicates that the kiva was in place at or during the second building episode.

It seems possible that Room 1 originally functioned as a field house, and later grew into the small rural hamlet of Component 2 at Site 5MT10595. With the limited amount of testing it was not possible to determine if Rooms 3 and 4 had south walls. It would not be out of character for this time period for these walls to have been of jacal construction, and if so evidence would not be seen until post holes could be found at floor level.

The small amount of wall fall rubble found within as well as outside of Room 1 indicated that no more than two additional courses of stone had been present above the three courses found at the time of excavation. These wall fall amounts found throughout the pueblo indicated that the stones were salvaged prehistorically for use elsewhere.

Economy and Adaptation at 5MT10595

Site 5MT10595 was a farmstead occupied by a small social group. Farming was indicated not only by the ground stone implements (manos, metates, tchamahias) recovered but also by the corn cupules in the macrobotanical samples. The variety of ceramic vessel forms (jars, bowls, dippers, pitchers) also indicated a habitation site. Beeweed seeds indicated that wild plants were utilized. The bones of a mule deer were processed when the bone was fresh indicating some use of wild animals. The local plants saltbush, sagebrush, rabbitbrush, pine, and juniper were utilized in the Feature 5, Room 5 hearth along with the corn.

There was some evidence of trade at 5MT10595. Six whiteware ceramics found at the site were manufactured in the Chuska Valley south of the San Juan River as indicated by the trachy basalt temper. Five sherds of redware made in southeast Utah were also present. Although it appeared that mostly local tool stone was used, there was some chalcedony which may have been procured from north central New Mexico.

Social Organization at 5MT10595

The social organization of the people at Site 5MT10595 was indicated by the size of rooms and their use as well as by estimating the number of people which would have inhabited the site. Different methods for estimating population have been based on the amount of floor space or number of individuals which could occupy a living room (Casselberry 1974, Rohn 1971, Cook 1972, and Flannery 1976). Rooms 1, 2, and 3, at 5MT10595 were all of a similar size and each contained 7 to 8.75 m^2 of floor space. Room 4 was small with only 3.23 m^2 of floor space. Room 5 also had a relatively small amount 4.8 m^2 of floor space. Rooms 1, 2, and 3 were probably living rooms, each representing a discrete household. Altogether these three rooms contained 22.75 m^2 of roofed floor space.

If each member of the household required 6 m^2 of floor space (Casselberry 1974) then only 3.79 people occupied Site 5MT10595. If there were only two people per living room (Rohn 1971) then there would have been six people living at Site 5MT10595. If it takes 15 to 35 m^2 of floor space for a family of five (Flannery 1976) then three to seven individuals lived at 5MT10595. The final estimate (Cook 1972) would place the population at less than six and greater than three. Given the present data base for site 5MT10595 the population at any one time was probably not less than 5 nor greater than 7 individuals and probably represented not more than two households at any one time.

Site 5MT10595 represented a rural hamlet which, even though it was part of a larger social interaction sphere, was fairly autonomous as an entity. 5MT10595 and similar small Pueblo II hamlets in the area formed a loosely knit neighborhood which probably had ties to the more tightly clustered community clusters which represented the urban centers during this time period (there are two such community clusters within 2 km of this site, one to the west one to the east).

The point here is that most of the models which have been used throughout the southwest to determine the complexities of social organization among the prehistoric peoples have been based on the ethnography of urban groups. One cannot separate the social aspects of the rural versus the urban since they all fall under the umbrella of a common social interaction sphere. However, the social norms practiced by the urban groups will differ from the rural groups to a greater or lesser degree.

The architectural construction sequence has already been presented as a series of three building episodes based on the information obtained from construction of wall abutments and wall ties. The paleodemographic estimates suggest that at no time were there more than two households occupying the site at any one time. At first it appears that the only one household was present in the form of Room 1. Next Rooms 3, 4, and 5 were added and finally Room 2 filled in the empty space which connected Room 1 with Rooms 3, 4, and 5. The kiva may or may not have been constructed when Room 1 was the only structure present but it was certainly constructed when Rooms 3, 4, and 5 were built. Therefore it appears that the social organization of this site was always at the household level and was organized around one or two families in a rural situation.

Montezuma Valley Segment Testing and Excavations Summary

This chapter has discussed the testing and excavation at sites 5MT10834, 5MT11706, 5MT11728, 5MT11729, and 5MT10595 which were impacted by the Mesa Verde Waterline Replacement Project Phase III construction. The variety of archeological sites encountered along the Mesa Verde Waterline transect through the Montezuma Valley demonstrated a variety of land use prehistorically from food processing pits to small hamlet habitation sites.

5MT10834 was a late Basketmaker III hamlet habitation site occupied between A.D. 725 and 750. 5MT11706 consisted of two parallel walls of a Pueblo II roomblock which was never completed. 5MT11728 was a single isolated Anasazi jacal structure which was destroyed by fire. 5MT11729 was a large oxidized pit which may have been used as a prehistoric food processing pit. 5MT10595 was a two component Pueblo II unit hamlet habitation site occupied between A.D. 900 and 1050.

CHAPTER 8
MONTEZUMA VALLEY SEGMENT EXCAVATION AT SITE 5MT10594

Joel M. Brisbin

Introduction

Site 5MT10594 was an Anasazi habitation site located in the pinyon/juniper woodland environment of the Montezuma Valley at an elevation of 2070 m, on a .5 km wide flat area between two deeply incised drainages (Figure 8.1). Site 5MT10594 was occupied during two separate time periods of the prehistoric occupation of the Montezuma Valley. The major component was a Basketmaker III/Pueblo I habitation site, the minor component was a Pueblo II occupation. Presently the area is managed by the USDI Bureau of Land Management (BLM) and used as wildlife habitat and for domestic livestock grazing. This site was excavated almost in its entirety over a period of two field seasons because of the impact of the construction associated with the Mesa Verde Waterline Replacement Project. The first season was conducted by the National Park Service Midwest Archeological Center (MWAC). The following season the Mesa Verde archaeological staff completed the excavations of the site.

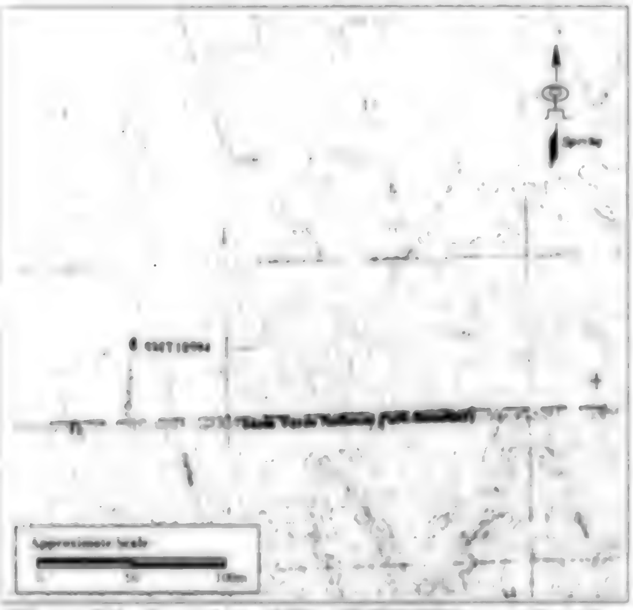


Figure 8.1. Location of Site 5MT10594 on reduced 7.5 minute USGS Point Lookout, Colorado Quadrangle map, 1965.

The Basketmaker III/Pueblo I component of the site consisted of a room block of three contiguous living rooms facing a courtyard area. Three small storage rooms were connected to two of the living rooms along their north sides. The plan and construction of the living rooms was unique in that they had wingwalls and shallow ramp entryways. There were two pitstructures associated with the site, one of which had probably never been completed. There was a midden area upslope and to the south and southeast of the pitstructures. The Pueblo II component was represented by three hearths and a burned rock midden built in the fill of Pitstructure 1.

Methodology

The 1992 initial phase of the excavation of 5MT10594 was conducted by personnel of the Midwest Archeological Center (MWAC) under the direction of Steve Dominguez. The site was divided into a 2-x-2 m grid system and all excavation was performed within this system. The grid units were excavated in arbitrary 10 cm levels and all material passed through 1/4 inch mesh. The 1993 excavations were conducted by the Mesa Verde Waterline Replacement Project archeological staff under the direction of Joel Brisbin. Horizontal provenience was based on an architectural unit or areal designation rather than grid units. Excavation levels were based on natural or cultural stratigraphy rather than arbitratry 10 cm levels. An overall stratigraphic sequence was determined across the site and an individual fill sequence was described for each structural unit.

The entire excavated portion of the site consisted of a roomblock with 3 habitation rooms and 3 storage rooms, a large pitstructure, a small pitstructure, a midden, a courtyard, and extramural features. MWAC crews excavated Room 1; Room 2; the east half of Room 3; four features in the fill of the large pitstructure; and 1-x-1 m test units in the midden, north of the roomblock, and east of the waterline, as well as some shovel probes to the east of the architectural features. The Mesa Verde crew excavated Pitstructure 1, defined Pitstructure 2, completed excavation of the western half of Room 3, excavated 3 storage rooms, and excavated ramp entryways on three habitation rooms. The Mesa Verde crew also excavated a test trench to the west of the existing room block to determine the presence of additional rooms. None were found. The courtyard area was also cleared to the prehistoric ground surface.

For analytical purposes, the 1992 and 1993 provenience systems were combined (Williams 1995). The site was divided horizontally into 6 excavation areas. Stratigraphic designations were made within each area below Stratum 1, an eolian silty loam present all across the site. The excavation areas were: Area I, Roomblock (7 m north-south by 13 m E-W at 259N/184E); Area II, Courtyard (3 m north-south by 13 m E-W at 256N/184E); Area III, Pitstructure 1 (9 m north-south by 10 m E-W at 247N/187E), Area IV, Midden (consisting of 2 1-x-1 m units at 246N/191.5 E and 244N/193E) ; Area V, North of the Roomblock (north of 266N and west of 197E); Area VI, East of the Waterline road (east of 197E) (Figure 8.2).

Architectural and Feature Descriptions of Component I at Site 5MT10594, Basketmaker III/ Pueblo III Occupation

Component I at Site 5MT10594 consisted of a single architectural suite of six rooms (1, 2, 3, 4, 5, 7)(Figure 8.3), a pitstructure (Pitstructure 1)(Figure 8.4) , a small courtyard area, and a midden. An architectural suite is used here to indicate the living area defined by a room suite, a pitstructure, and an associated courtyard (Lightfoot 1993). A room suite is a group of surface rooms that are spatially and architecturally associated. The other architectural feature at the site, Pitstructure 2, was probably started but never finished or occupied (Figures 8.5 and 8.6).

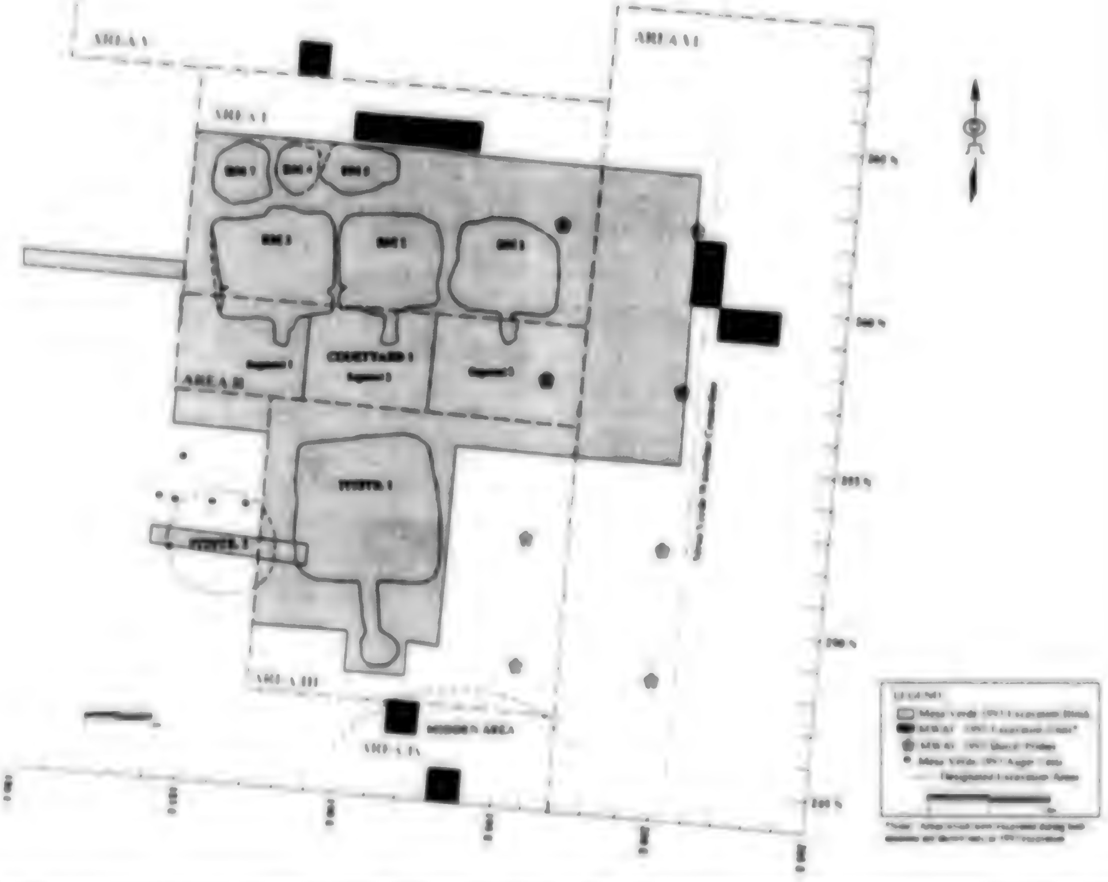


Figure 8.2. Extent of testing and excavation at Site 5MT10594.

Figure 8.3. Component I room suite at Site 5MT10594, including Rooms 1, 2, 3, 4, 5, and 7, looking south.

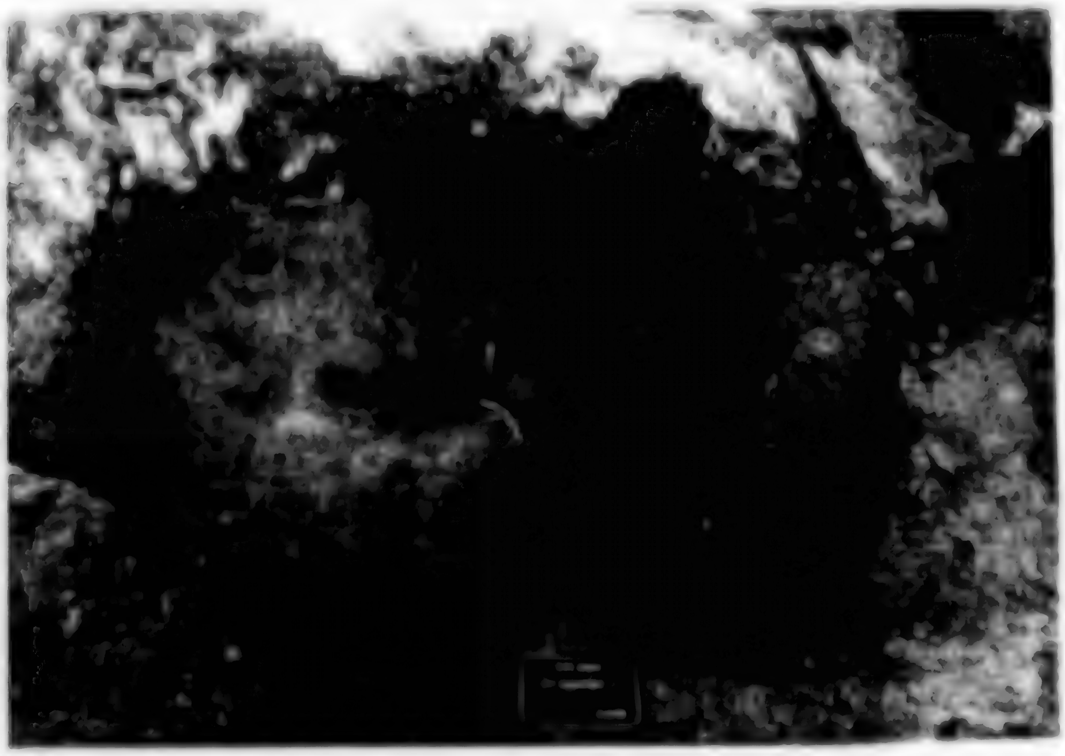


Figure 8.4. Pitstructure I at Site 5MT10594, looking east.

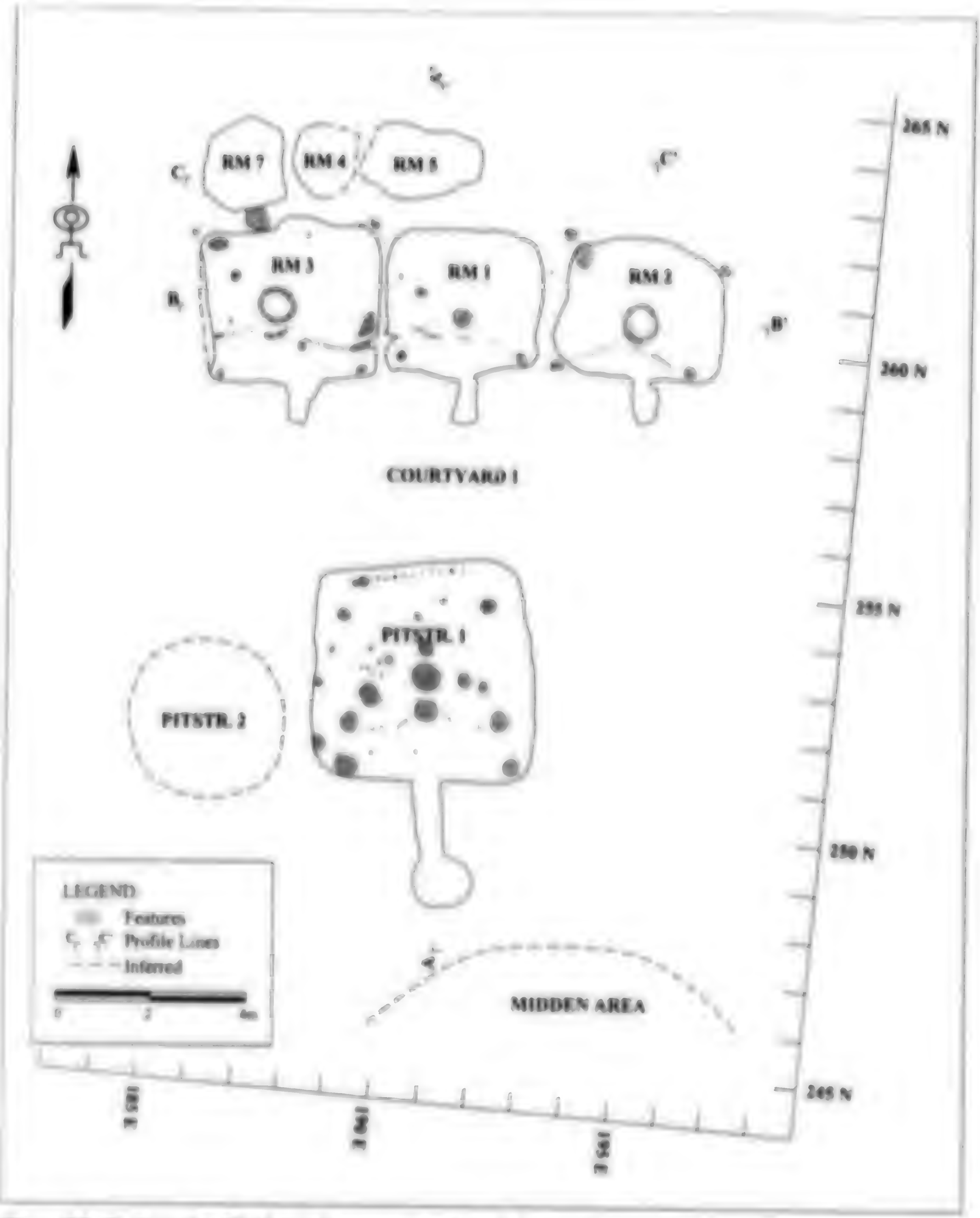


Figure 8.5. Basketmaker III / Pueblo I component at Site 5MT10894.

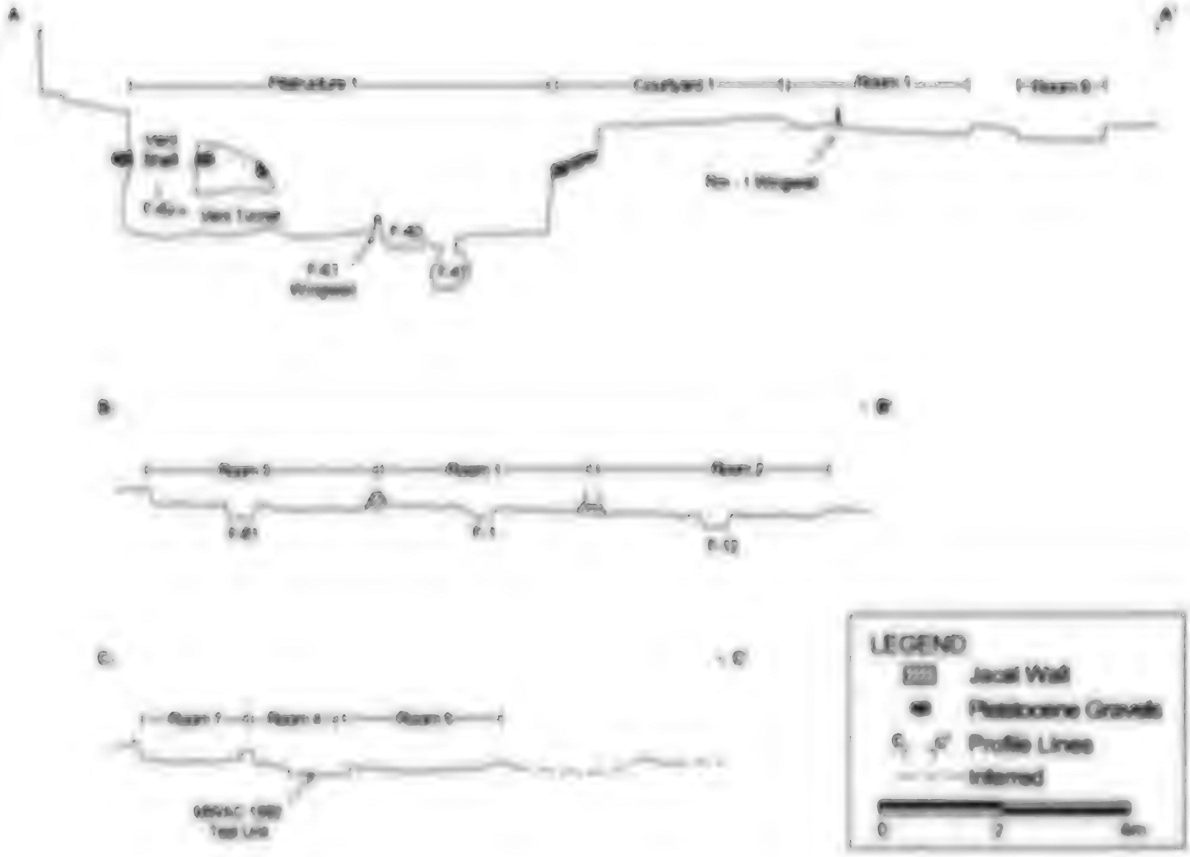


Figure 8.6. Architectural profiles across structures at Site SMT10594 (refer to plan for profile locations).

Room 1

Length : 3.39 m

Width : 3.13 m

Area : 9.55 m^2

Room 1 was the central room of the three contiguous front rooms in Room Suite 1. In plan view, this room resembles a Pueblo I pitstructure (Figure 8.7). There was a wing wall segregating the southern one third of the floor area from the main room, a central hearth located north of the center of this wingwall, and two additional pits found in the northwest quadrant of the main living room. In the area south of the wingwall there were two main roof support sockets, one in each corner, and a ramp entryway in the center of the south wall. The presence of two additional post sockets in the northern corners of this room, or immediately outside, were suspected but could not be defined.

Stratigraphy of Room 1

Silty alluvial deposits were found on the floor of Room 1 near the western wall. These silt deposits were particularly evident around the edges of the room. The floor was not oxidized. In patchy areas on top of this silt deposit were shallow lenses of both burned roof fall (Stratum 2 -Burned Roof Fall) and unburned fill (2A-unburned fill within the Structure). Stratum 1 was the eolian silty loam which covered the site.

Construction of Room 1

The walls of Room 1 were constructed of jacal, based on the presence of postholes (Features 64, 87). The fill in the post sockets of Features 64 and 81 was gray silty clay loam interspersed with charcoal bits. A third post hole was located during the 1992 field season near the south end of the partition wall which separates Rooms 1 and 3.

Surface 1 and Features of Room 1

Surface 1 of Room 1 was compacted by use. The floor surface of this room was not oxidized but was covered in places by burned roof fall. Surface 1 had 8 associated features: 2 post holes, ramp entryway, a wingwall, central hearth, and three small floor pits (Table 8.1).

Feature 1 was the central hearth in Room 1. It was located to the north of the central portion of the wingwall (Figure 8.8). This hearth was the only one of the three hearths in the front rooms that did not

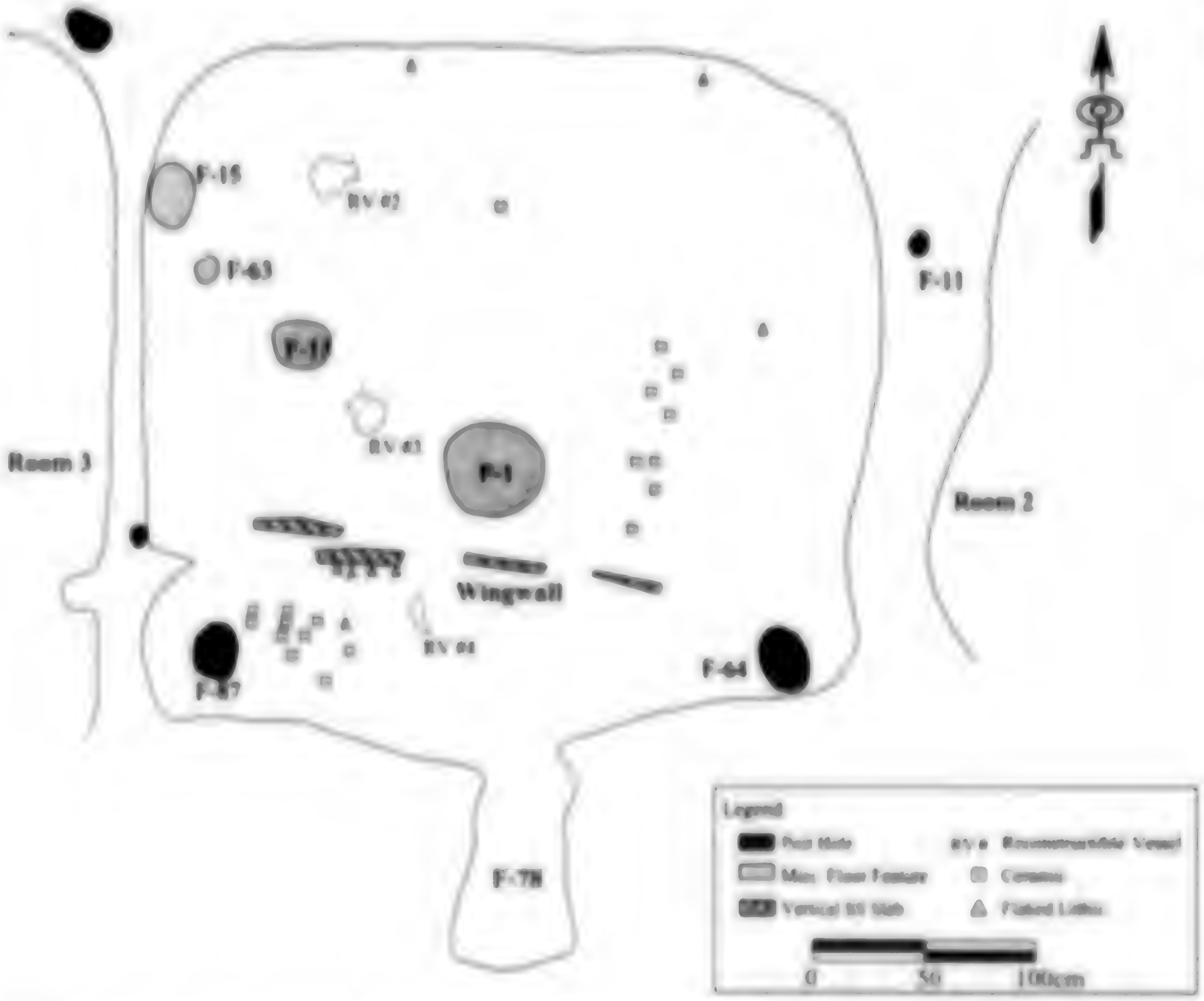


Figure 8.7. Plan View of Room 1, Surface 1 at Site 5MT10594, with associated features and artifacts.

Table 8.1. 5MT10594, Room 1, Surface 1, Feature Dimensions

Feature #, Description	Length (cm)	Width (cm)	Depth (cm)
1, Hearth	45	40	19.5
13, Pot Rest	28	20	10
15, Floor Pit	32	25	variable
63, Floor Pit	11	11	13
64, Post Socket	37	28	39
78, Ramp Entry	94	40	6
87, Post Socket	23	23	31
Wing wall	3.2 m	8 to 10	35

have an applied adobe coping around the rim. The rim as well as the side walls of this hearth were oxidized. The fill consisted of a primary deposit of ash and charcoal.

Feature 13 was an oval basin shaped pit located to the northwest of the central hearth. This feature contained a sandy fill and was probably used as a pot rest to help support the round bottomed vessels when they were in use around the hearth. Feature 15 was an oval pit located northwest of Feature 13, adjacent to the west wall of Room 1.

Features 64, and 87 were the two main support post sockets located in the southwestern and southeastern corners of the room. The fill of both of these features consisted of a gray silty loam interspersed with charcoal flecks and occasional very small fragments of sandstone. Without the charcoal and sandstone inclusions the matrix appeared identical to the native sterile soil.

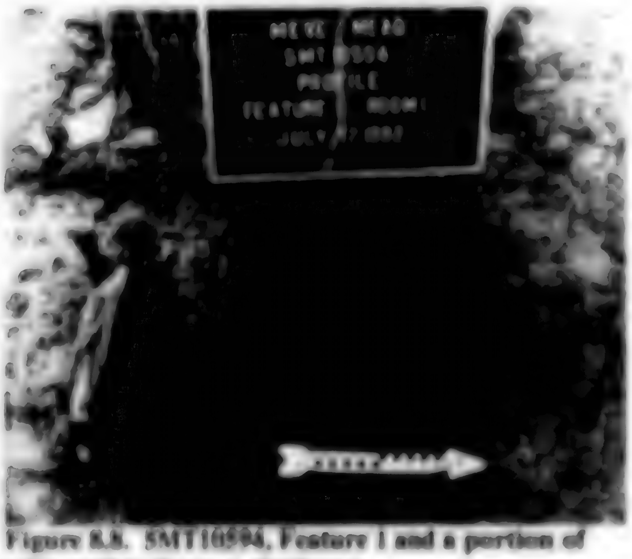


Figure 8.8. 5MT10594, Feature 1 and a portion of wing wall in Room 1, Surface 1.

The core of the wingwall consisted of 5 vertical slabs set more or less end to end. The eastern most slab butted against the eastern wall whereas the westernmost slab stopped 50 cm short of the western wall. This final 50 cm gap consisted of a ridge of native soil which extended out from the western wall and tied into the westernmost slab. The prehistoric height of this ridge of native soil could not be determined thus it was unclear if it acted as a barrier or if it was a low step. From remnants of adobe still adhering to some of the slabs, as well as along the base of the wingwall, it appears that the vertical slab core was completely covered by a thick layer of adobe.

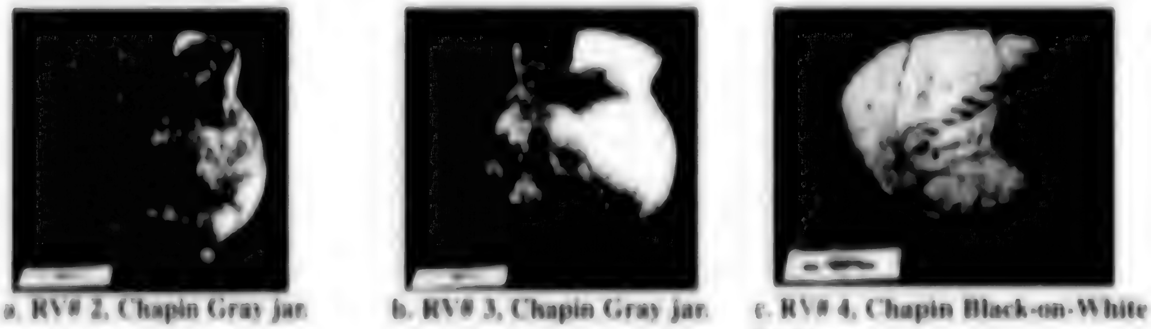
Feature 78 was the narrow ramp entryway located in the center of the south wall. The upper end of this feature was 52 cm in width and narrowed to 32 cm near the entrance into Room 1. This feature, sloped from top to bottom with a drop of 12 cm along its 94 cm length.

Material Culture of Room 1

A total of 285 artifacts were recovered from the fill, floor, and features of Room 1. Of these items 242 were ceramic, 7 were flaked lithic tools, 5 were non-flaked lithic tools and 31 were flaked lithic debitage.

Ceramics Recovered from Room 1

Of the 242 ceramic sherds recovered from Room 1, 95 were from three reconstructible vessels: 2 Chapin Gray jars (RV 2, 3), and a Chapin Black-on-white bowl (RV 4) (Figure 8.9) (Table 8.2). The jars had a volume of 2.55 and 3.0 liters respectively and the bowl had a 1.1 liter capacity. All three vessels were lying on Surface 1 (Figure 8.10). The other formal ceramic type in the assemblage was Abajo Red-on-orange. There were 4 sherds which appeared to be a transitional variant between Chapin Black-on-white and Piedra Black-on-white. There were three grouped types present: Gray Body (Plain Gray), Painted White, and Polished White. The vessel forms represented by these sherds were jars (195 sherds), bowls (38 sherds), and 9 indeterminate.



a. RV# 2, Chapin Gray jar.

b. RV# 3, Chapin Gray jar.

c. RV# 4, Chapin Black-on-White bowl.

Figure 8.9. Reconstructed vessels from 5MT10594, Room 1, Surface 1.

With the exception of two sherds, all ceramics had been tempered with crushed igneous rock, indicating local manufacture. The two exceptions were tempered with crushed igneous rock and sand and both of these were from Abajo Red-on-orange bowls.

In this region of the Southwest it is rather common during the Basketmaker III and Pueblo I Period to find gray or white ware treated with either an interior or exterior application of red hematite. This coating is applied after the vessel has been fired and readily comes off in water. Thus, it has been termed fugitive red. Within Room 1, 12% of the ceramic inventory had fugitive red interiors or exteriors. Twenty-two of the sherds with fugitive red were bowls (13 of these were a reconstructible Chapin Black-on-white bowl, RV4), 6 were jars and 1 was indeterminate.

Table 8.2. 5MT10594, Room 1 Ceramic Types and Forms

	Jar	Bowl	Indeterminate
Plain Gray Body	121	3	3
Chapin Gray	69	1	3
Painted White		5	
Polished White	5	11	3
Chapin B/W		12	
Piedra B/W		4	
Abajo R/O		2	

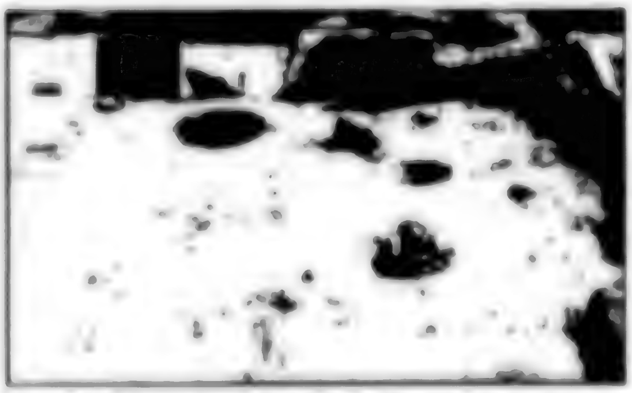


Figure 8.10. In situ orientation of reconstructed vessels 2 and 3 on Surface 1, Room 1, 5MT10594.

Lithics from Room 1

There were 11 flaked lithic tools, 5 nonflaked lithic tools, and 27 pieces of flaked lithic debitage found in Room 1. A single bitted axe, hammerstones, and choppers were the flaked lithic tools found on the floor of Room 1 (Table 8.3). Three manos were the nonflaked lithic tools found on the floor surface. Two trough metates were found in the fill (Table 8.4). Eighteen pieces of flaked lithic debitage were found on the floor and 13 pieces were found in the room fill (Table 8.5). Three of the four flakes which had been utilized were found on Surface 1. The most frequently occuring lithic material type in the assemblage was quartzite (58%) followed by chert (23%).

Table 8.3. 5MT10594, Room 1 Flaked Lithic Tool Forms and Material Types

	Axe	Chopper	Core	Hammerstone	Utilized Flake
Basalt		2	1		1
Chert					2
Granite	1			1	
Quartzite			1	1	
Sandstone					1

Table 8.4. 5MT10594, Room 1 Nonflaked Lithic Tool Forms and Material Types

	Mano, Shaped 2-Hand	Mano, Unshaped 1-Hand	Metate
Granite		1	
Limestone			1
Quartzite		1	
Sandstone	1		1

Table 8.5. 5MT10594, Room 1 Flaked Lithic Debitage Forms and Material Types

	Primary	Secondary	Tertiary
Basalt		2	
Chert			5
Limestone		1	
Quartzite	3	5	10
Sandstone		1	

Pollen from Room 1

A series of four pollen samples from Room 1 was collected and processed. One of these was taken from the primary hearth fill (Feature 1). This sample contained a relatively small percentage of arboreal pollen. The dominant element of the arboreal pollen was *Pinus* (pine), although small quantities of both *Juniperus* (juniper) and *Quercus* (oak) pollen were also present. A moderate frequency of *Artemisia* (sagebrush) pollen was found in the sample. Economic plants represented by the pollen from Feature 1 included Cheno-ams (goosefoot and amaranth), *Cleome* (beeweed), *Poaceae* (grasses), and a small amount of *Zea mays* (corn).

Three manos from the floor of Room 1 were collected and washed for pollen. Traces of *Pinus, Juniperus, Artemisia, Cleome, Ephedra* (Mormon tea) and *Cercocarpus* (Mountain mahogany) were recovered from these groundstone items. Most of the economic pollen was recovered from the mano lying south of the wingwall. On this mano there were small quantities of *Cleome*, *Typha latifolia* (Cattail), and *Zea mays*.

The final pollen samples were taken from a Chapin Gray jar and a plain gray jar body sherd which were recovered from the main chamber, and from a partial Chapin Black-on-white bowl located south of the wingwall. Cheno-ams and beeweed were found on all three ceramic vessels. Corn pollen was found on the jar sherds.

Faunal Remains from Room 1

A total of 69 nonhuman bone fragments were recovered from the fill, floor, and features of Room 1. Due to the extremely fragmentary nature of the specimens they could not be identified more closely than the order level. There were 37 mammal bones, 32 unknowns, and no bird remains. The hearth, Feature 1, contained 11 mammal bones. The sand filled pit, Feature 13, contained 5 mammal bone fragments and there were three mammal bone fragments lying on the floor surface. The rest of the bone fragments were found in the fill.

Room 2

Length : 3.71 m

Width : 3.06 m

Area : 9.54 m^2

Room 2 at Site 5MT10594 was the easternmost of the three front rooms in the architectural suite. The room was rectilinear with rounded corners in plan view (Figure 8.11), and was dish shaped in profile. Room 2 had 10 associated features which included a central adobe coped hearth, five vertical post support sockets, a shallow ramp entry in the center of the south wall, a vertical slab wing wall which radiated diagonally from the hearth and terminated in the southwest and southeast

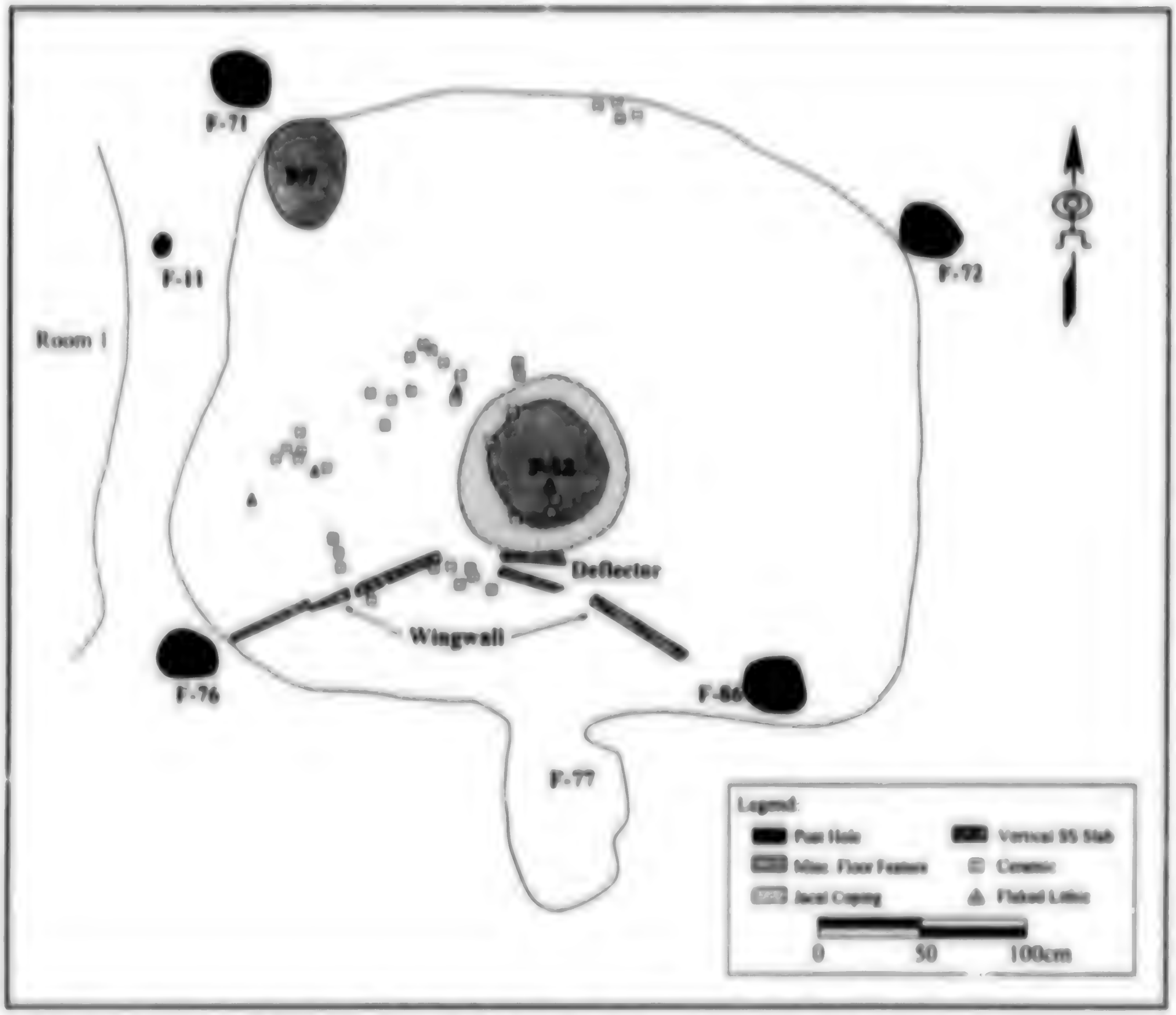


Figure 8.11. Plan view of 5MT10594, Room 2, Surface 1 with associated features and artifacts.

corners of the room, a vertical deflector slab just south of the hearth, and a storage pit in the northwest corner.

Stratigraphy

Post abandonment sediments averaging 25 cm in depth were found above the floor of Room 2. In areas across the floor there were thin lenses of alluvial sediments. The floor was not oxidized. Interspersed across the floor as well as on top of these sediments there were small pieces of charcoal, burned adobe, and oxidized sandstone (Stratum 2 Burned Roof Fall). The bulk of the fill in this room was Stratum 2A (non-burned fill within the structure) a post abandonment deposit of brownish gray silty loam interspersed throughout with charcoal fragments and bits and pieces of oxidized sandstone. This stratum appeared to be primarily soil which at one time covered the roof and side walls of this room. There was also a layer of recent forest duff covering the room deposits. Artifactual material was found throughout the fill of this room with the exception of the uppermost duff zone.

Construction of Room 2

Room 2 was of jacal construction based on the remains of a four post roof support system and the lack of masonry walls. Three of these vertical posts, Features 71, 72, and 76 were located at the exterior corners of the room and only Feature 86 was interior in the extreme southeast corner. These four posts probably supported the horizontal members of a flat roof.

A single small post socket, Feature 11, was found at the north end of the partition wall which separated Room 2 from Room 1 which further implies the walls were constructed of jacal.

Surface 1 and Features in Room 2

The surface of Room 2 was a compacted by use on top of the sterile subsoil at the site (Figure 8.12). There was no evidence of additional floor preparation. There were 10 features in Room 2: six directly associated with the floor surface, and four adjacent to the structure boundaries: storage pit (Feature 7), central hearth (Feature 12), wingwall (no field number), deflector slab (no field number), post holes (Features 71, 72, 76, 86), post socket (Feature 11), and a ramp entryway (Feature 77) (Table 8.6).

Feature 7 was a storage pit in the northwest corner of Room 2 that was cylindrical in plan view and in profile. It measured 60 cm in length by 45 cm in width and was 60 cm deep. The fill in the feature consisted of alternate layers of silty clay.

Figure 8.12. 5MT10594, Room 2, Surface 1 with associated features and artifacts.

Feature 12 was the central hearth and was located in the central gap of the wing wall north of a deflector slab (Figure 8.13). In plan view it was circular with a diameter of 55 cm inside the coping. The adobe collar ranged in width between 10 and 18 cm and averaged 4 cm in height. The feature fill was a primary deposit of ash and charcoal fragments.

The wing wall and deflector slab were located in the southern portion of Room 2. The core of the wingwall was made up of 4 vertical slabs which had been set from 5 to 10 cm into Surface 1. Three of these made up the west side and one 70 cm long slab (a trough

Table 8.6. 5MT10594, Room 2 Feature Dimensions

Feature #, Description	Length (cm)	Width (cm)	Depth (cm)
7, Storage Pit	60	45	60
12, Central Hearth	55 diameter	N/A	N/A
Wing Wall	140	N/A	N/A
Deflector Slab	35	5	35
71, Post hole	29	21	32
72, Post hole	32	20	42
76, Post hole	30	21.5	30
86, Post hole	22	19	41
11, Post socket	N/A	N/A	N/A
77, Ramp entryway	96	54	4

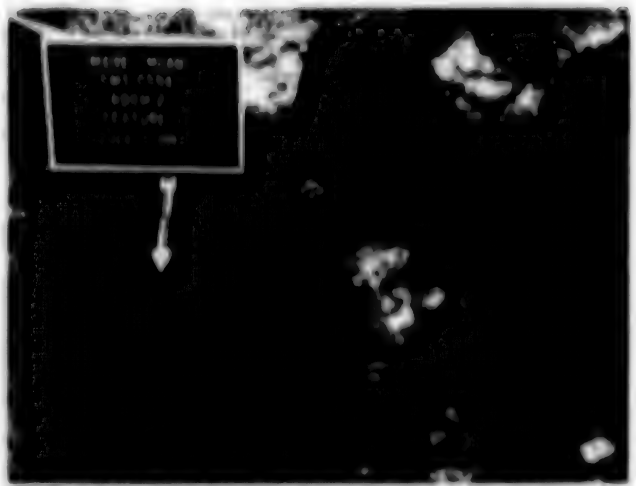


Figure 8.13. 5MT10594, Room 2, Feature 12 (coped hearth), deflector slab, and a portion of wing wall.

metate) was used for the bulk of the east wing. The scant evidence remaining indicated that these slabs were then covered by a 4 to 5 cm thick layer of adobe to form the exterior face of the wing wall. In the central section a gap 90 cm was left open to allow for easy access between the main room and the smaller space south of this wingwall. This 90 cm gap was somewhat constricted by the addition of a single upright slab which acted as a wind screen (deflector slab). This deflector was single slab which had split along a natural fracture line.

Features 71,72,76, and 86 were the four vertical support posts associated with Room 2. The fill in all four post holes was homogenous gray brown silty clay interspersed with charcoal bits and occasional artifactual material. Feature 11 was a small post socket near the north end of the partition wall separating Rooms 1 and 2.

Feature 77 was the shallow entryway into Room 2 at the center of the south wall. This feature was 96 cm in length by 54 cm in width and had a mean depth of 4 cm. From the top of the entry down to where it entered into Room 2 there was a vertical drop of 11 cm. The fill of this ramp entry differed in no way from the general fill of the structure.

Material Culture in Room 2

A total of 463 artifacts were found from the floor, the fill, and the features of Room 2. There were 381 ceramic sherds, 11 flaked lithic tools, 5 nonflaked lithic tools (manos and metates), and 66 pieces of lithic debitage some of which had been utilized

Ceramics in Room 2

There were 381 ceramic sherds recovered from Room 2 (Table 8.7). All were tempered with crushed igneous rock indicating that they were manufactured in the Mesa Verde Region. Of these, 255 were found on or within 5 cm of the floor and the remaining 126 were in the fill. Three formal types were represented in the assemblage: Abajo Red-on-Orange, Chapin Black-on-white, and Chapin Gray. The greatest bulk of the ceramic assemblage was identified as the grouped type Gray Body (260). Grouped types Painted White and Polished White were also represented. Three vessel forms were represented in the assemblage from Room 2. A total of 308 were from jars, 57 from bowls and 2 from seed jars.

Ceramic artifacts were found in two of the features. The hearth, Feature 12, contained 20 sherds and the storage pit, Feature 7, contained 3. Nineteen of the hearth sherds were from a Chapin Black-on- white jar and one sherd was a bowl form. The three sherds from the storage pit were all gray ware body sherds from a jar.

Table 8.7. 5MT10594, Room 2 Ceramic Types and Forms

	Jar	Bowl	Seed Jar	Indeterminate
Plain Gray Body	250	1		9
Chapin Gray	48	2	1	
Painted White	2	1		
Polished White	7	48	1	5
Chapin B/W		2		
Abajo R/O	1	3		

Lithics in Room 2

There were 11 flaked lithic tools, 5 nonflaked lithic tools, and 66 pieces of flaked lithic debitage found in Room 2 (Tables 8.8, 8.9, and 8.10). Of the eleven flaked lithic tools 2 were utilized flakes, 5 were choppers and 4 were cores. Three of the 5 chopper tools were found on the floor of Room 2. Twenty-five pieces of flaked lithic debitage were found on the floor. Within the hearth fill there was a flaked chopper, six tertiary flakes, and an unshaped one hand mano. A utilized secondary flake,a tertiary flake, and two utilized cores were found in the main support post hole (Feature 72).

The preferred flaked lithic material type was quartzite (59%), followed by chert (28%). There was a single utilized flake of chalcedony. The greatest number of debitage flakes were tertiary, followed by secondary, with only 5 primary flakes. Over 50% of the flaked lithic assemblage was found in the room fill.

The nonflaked tool inventory for this structure consisted of 2 two-hand manos, 1 unshaped one-hand mano and 2 trough metates. One of the trough metates was lying loose in the room fill and the other was the core of the west wingwall. The unshaped one-hand mano and the wingwall metate were made from sandstone and the other three tools were of limestone.

Table 8.8. 5MT10594, Room 2 Flaked Lithic Tool Forms and Material Types

	Chopper	Core	Utilized Flake
Basalt	4	4	
Chalcedony			1
Quartzite	1		1

Table 8.9. 5MT10594, Room 2 Nonflaked Lithic Tool Forms and Material Types

	Mano, Shaped 2 Hand	Mano, Unshaped 2 Hand	Metate
Limestone	2		1
Sandstone		1	

Table 8.10. 5MT10594, Room 2 Flaked Lithic Debitage Forms and Material Types

	Primary	Secondary	Tertiary
Basalt	1	2	1
Chert		5	14
Hornfels		2	
Quartzite	3	15	21
Sandstone	1	1	

Pollen from Room 2

Six pollen samples were collected from Room 2. Five of the six samples came from ground stone tools or fragments of tools in the fill and on the floor and the sixth was a floor sample to the west of the hearth.

The pollen washes from the groundstone items contained no cultigen pollen, but they all contained pollen in various degrees of Cheno-am, *Pinus*, and *Cleome* as did the sample taken from the floor near the hearth.

The pollen sample taken near the hearth also contained corn, *Shepherdia* (buffalo berry), and *Physalis* (ground cherry).

Faunal Remains from Room 2

The faunal remains recovered from Room 2 were in the same fragmentary condition as those found in Room 1. For this reason they were unidentifiable below the order level. A total of 121 fragmentary pieces of nonhuman bone was recovered. Ninety-seven or 80% of these remains were in floor contact or in features and the remaining 24 were in room fill. Three of the fragments were identified as bird, 62 as mammal and 59 as unknown. The hearth (Feature 12) contained 49 of the 97 floor fragments and all were mammal. Six mammal bone fragments were found in the fill of the bell shaped storage pit (Feature 7) in the northwest corner of the room. Out across the main chamber floor there were 7 bone fragments two of which were bird, 1 mammal and the four remaining fragments were unidentifiable. South of the wingwall scattered across the floor there were 34 bone fragments.

Two of these were bird, 15 were mammal and the remainder unidentifiable.

Radiocarbon Dating Samples from Room 2

Charcoal samples from the central hearth (Feature 12) fill were taken and submitted for analysis. The sample yielded a date of 1580+/-60 B.P. This date of from A.D. 310-430 may have been from dead wood used in the fire.

Room 3

Length: 4 m

Width : 3.64 m

Area : 12.08 m^2

Room 3 was the westernmost front room in Architectural Suite 1 (Figure 8.2). The eastern one third of this room was excavated down to the top of the roof fall level by MWAC. The excavation of the remainder of the room and all of the floor was completed by the Mesa Verde Waterline crew.

This room not only contained the most floor area but it also had the most floor features. There were 15 floor features associated with Surface 1: four main structural support sockets, an entryway ramp, sand filled pits, a central hearth, wingwall, deflector, and a basin shaped depression used as a step.

Stratigraphy of Room 3

Room 3 had only two stratigraphic levels (Figure 8.14). Surface 1, the floor surface was oxidized to various degrees. The lowest stratum (Stratum 2) was a grayish brown silty clay with a high content of charcoal in the form of burned beams, chunks, and flecking. Intermixed throughout were chunks and fragments of burned jacal, oxidized fragments of tabular sandstone as well as small nodules of caliche. Throughout this burned roof fall layer and extending down to the floor surface were numerous artifacts primarily ceramic sherds. Many pieces of tabular sandstone were found in this roof fall layer around the hearth. All structural collapse in Room 3 was burned. (Stratum 2a-nonburned structural collapse, was not found in Room 3). Above the structural collapse, Stratum 1 was found which was the silty sandy loam deposit which covered the whole site.

Construction of Room 3

As with the other rooms in this architectural suite, Room 3 was constructed of jacal as indicated by the four primary roof supports located in the four corners of the room and the lack of masonry. The two northern roof supports (Features 60 and 83) were located immediately outside to the room's exterior and the two southern support posts (Features 84 and 85) were inside the room in the extreme southwest and southeast corners. Besides the four main support posts no additional post holes could be found to indicate the type of side wall construction.

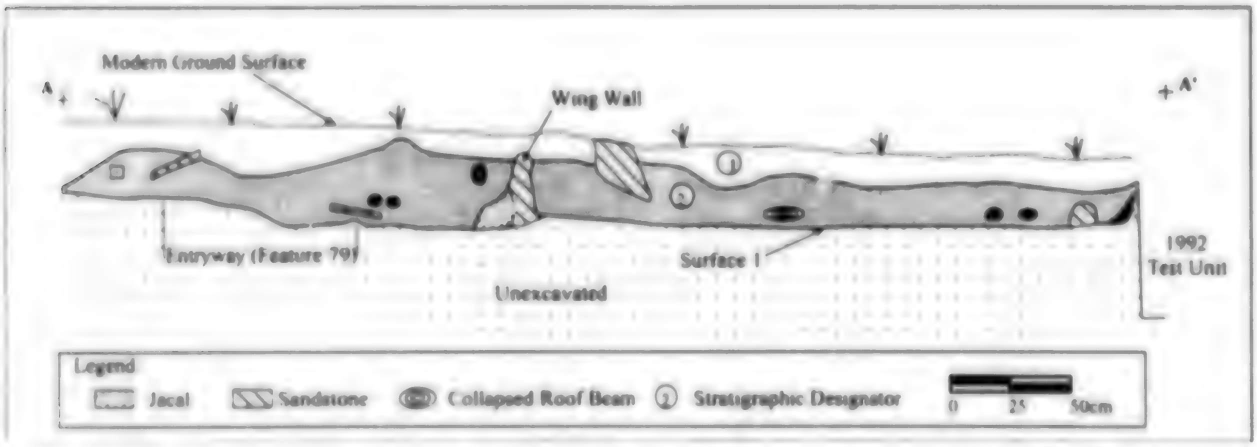


Figure 8.14. Stratigraphic profile of Room 3, Site 5MT10594.

Surface 1 and Associated Floor Features in Room 3

Fifteen features were associated with the floor surface of Room 3: four main structural support sockets, an entryway ramp, sand filled pits, a central hearth, wingwall, deflector, and a basin shaped depression used as a step (Table 8.11).

Table 8.11. 5MT10594, Room 3 Feature Dimensions

Feature #, Description	Length (cm)	Width (cm)	Depth (cm)
60. Post hole	32	20	23
75. Bell-shaped Pit			33
top	33	46	
bottom	67	71	
79. Ramp	81	33 to 82	17 to 18
80. Pit	26	23	10
81. Hearth	58	53	23
82. Pit	13	9	8
83. Post hole	20	18	38
84. Post hole	20	16	16
85. Post hole	23	18	19
89 Pit	12	12	3
90. Pits (3)	10	10	5 to 7
91. Pit	14	12	12
92. Wing wall		10 average	50 average
west	100		
east	140		
93. Deflector	30	5	40
94. Step	58	47	5

The four main post sockets Features 60, 83, 84, and 85 were filled with a mixture of silty alluvial clays as well as charcoal and fragments of burned jacal.

A bell shaped storage pit (Feature 75) was located in the northwest corner of the room. The major portion of the fill in this pit was a redeposited native sandy clay loam with a sprinkling of charcoal and small bits of burned jacal. Only the uppermost 6 to 7 cm of fill was pure burned roof fall and the top of Stratum 2 directly beneath the roof fall was oxidized.

Feature 79 was a ramp entryway like that found in the center of the south walls of all of the living rooms. From the top of the entry down to floor level inside the room the ramp dropped 10 cm. A low vertical slab had been set into the floor approximately 15 cm north of the juncture of the entry ramp and the room proper.

Feature 80 was located midway between the hearth and Feature 75. This basin shaped feature was sand filled and may have been utilized as an area where the large round bottomed storage jars were placed in order that they stay upright.

Feature 81 was the central hearth, located just north of the central gap of the wingwall (Figure 8.15). Prior to abandonment it appeared that Feature 81 had been remodeled and sealed shut by an adobe cap 8 cm in thickness. The remodelling consisted of adding a thick layer of adobe to the hearth's original bottom and sides rendering the hearth both shallower and narrower. Along the south side, this adobe liner was brought to the top of the adobe coping which encircled the feature

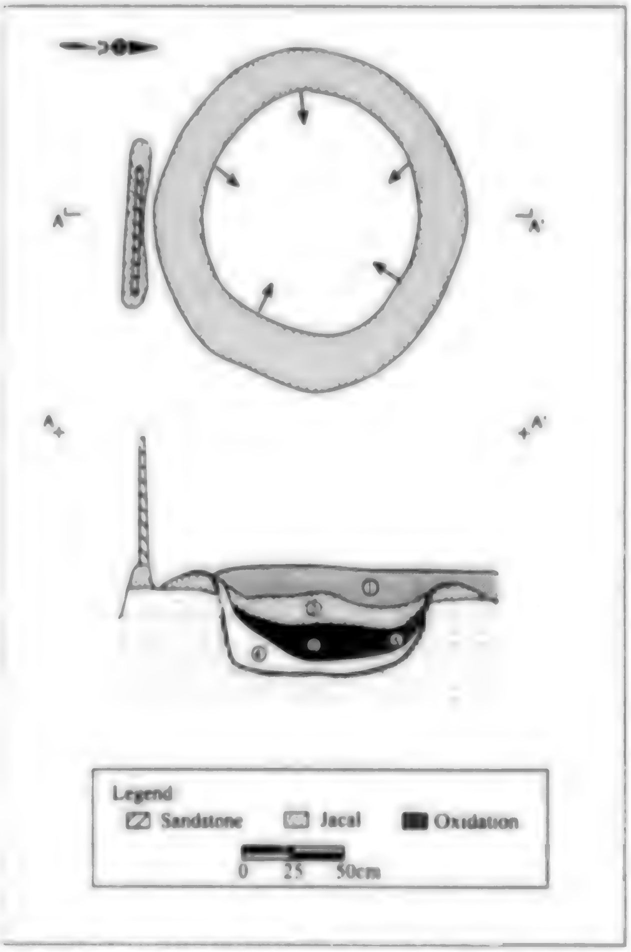


Figure 8.15. Plan and profile maps of Feature 81: 5MT10594, Room 3, central hearth.

and in this area was 3 cm thick. The adobe across the bottom reduced the overall depth from 45 cm to 40 cm and the new lining along the north half averaged 1 to 2 cm in thickness. The lining along the north side of the hearth did not reach the bottom of the encircling adobe coping whereas on the south half it extended to the top of this coping .

Feature 82 was a small cylindrical pit found in the southwest quadrant of the room and just north of the wingwall. The fill of this feature consisted entirely of burned roof fall.

Feature 89 was a small sand filled basin located near the center of the north wall.

Feature 90 consisted of a series of three small basin shaped pits located immediately south of the deflector slab (Feature 93). These three sand filled pits formed a fairly straight line 50 cm in length, that runs from the eastern corner of the deflector slab in a southwesterly direction.

Feature 91 was a basin shaped pit located south of the wing wall. It contained a reddish brown loamy sand with charcoal flecks, burned jacal, and caliche flakes.

Feature 92 represents the wing wall. The feature is made up of a west half and an east half with a 1.1 m gap found just west of center. This feature effectively segregates the southern third of the available floor space away from the northern two thirds of the room. A series of five vertical slabs were set into the floor end to end. Three of these were to the west of the gap and two in the eastern section. Liberal amounts of adobe mortar were utilized to cover these core slabs as well as to join the wingwall to the sides of the room. There was a space 40 cm in width between the eastern end of the eastern half of the wingwall and the southeastern corner of the room. This space was filled using pure adobe and rose to an unknown height. This is almost exactly the manner in which the wingwall in Room 1 was built.

The deflector slab, Feature 93, was a single vertical slab of sandstone which was erected directly south of the hearth. If it had ever been encased in mud mortar no evidence remained except along the extreme lower margins across the base where the stone was set into the floor. This basal mortar had a "finished" look which may mean that the upper portion of the slab was not covered.

Feature 94 was a basin shaped depression located on top of the north wall of Room 3 which separated Room 3 from Room 7. This feature seems to have been worn into the wall more from use as a step rather than formed by deliberate construction. A vertical slab (broken and disturbed) at one time appeared to have been set into the face of the wall of Room 7 and spaned the distance across the face of this depression. The fill in Feature 94 was the same burned roof fall that covered the floor of Room 3.

Material Culture of Room 3

From all proveniences of Room 3, a total of 655 artifacts was recovered. Of this total, 595 were ceramic, 7 were flaked lithic tools, 13 were nonflaked lithic tools, 16 were utilized flakes, and 42 were flaked lithic debitage.

Ceramics from Room 3

The vessel forms of the 595 ceramic sherds from Room 3 were varied (Table 8.12). There were 39 bowls, 1 feather box, 1 gourd dipper, 447 jars, and 2 pitchers. Also present were 105 sherds whose vessel form could not be determined because of their fragmentary nature.

Fifty-two sherds were assignable as to a formal type and the remaining 543 were assigned to a grouped type. Of the formal types there were 8 Abajo Red-on-Orange, 1 Bluff Black-on-Red, 7 Chapin Black-on-White, 1 Piedra Black-on-White and 35 Chapin Gray. The greatest bulk of the grouped type ceramics were from Plain Gray jars (the Gray Body category) (407 of the 512 sherds). There were 2 sherds classed as Early Pueblo Red. Twenty-five white ware sherds were not typable since they lacked design elements.

The tempering agent in all but two of the 595 sherds was crushed igneous rock, which is indicative of manufacture in the Mesa Verde region. The two sherds from Abajo Red-on-orange bowls were tempered with crushed igneous rock and sand.

A fugitive red slip had been applied to 36 sherds representing 16 bowls and 20 jars.

Table 8.12. 5MT10394. Room 3 Ceramic Types and Forms

	Jar	Bowl	Pitcher	Feather Box	Gourd Dipper Handle	Indeterminate
Plain Gray Body	407	2				103
Chapin Gray	33		2			
Painted White	1	8				
Polished White	5	8				2
Sherd White					1	
Chapin B/W		7				
Piedra B/W		1				
Early Pueblo Red	1	5				
Abajo R/O		8				
Bluff B/R				1		

Thus far the ceramics have been summarized by total number recovered from all proveniences associated with Room 3. There were few sherds (18) recovered from Stratum 1, the post abandonment deposit which encompassed the entire site. The remainder of the ceramics (577) came from the burned roof fall, the floor surfaces, or floor features. Many of the 152 ceramics recovered from the roof fall level were associated with sherds or reconstructible vessels on the floor.

There were 409 ceramic sherds lying on the floor surface of Room 3 (Figure 8.16). These floor artifacts represented 4 Abajo Red-on-orange bowls, 6 Chapin Black-on-white bowls, 27 Chapin Gray jars and one Chapin Gray pitcher (Reconstructible Vessel # 1). Many of the Chapin Gray jar sherds fit together to form parts of other reconstructible vessels. A total of 141 of the gray ware floor sherds were refitted and represented 6 reconstructible vessels, all of which were Chapin Gray jars.

In the fill of the floor features, 16 ceramic sherds were found. In the storage pit in the northwest corner (Feature 75) there were 6 jar sherds, 2 bowl sherds and 1 of indeterminate vessel form. Four sherds found on the surface of the entryway (Feature 79) were from a jar and a bowl. One gray ware jar sherd was the only artifact recovered from the hearth fill (Feature 81) fill. Two small gray ware jar sherds were found in the small cylindrical pit (Feature 82).

Lithics from Room 3

Seven flaked lithic tools, 16 utilized flakes, 14 nonflaked lithic tools, and 42 pieces of lithic debitage were found in Room 3 (Tables 8.13, 8.14, and 8.15).

Of the six flaked lithic tools recovered from Room 3, five were found on the floor: the midsection of a chert knife (PL 83), two asymmetrical bifaces, two cores and one hammerstone. All of the tools had one or more bifacially shaped facets. One chert chopper was found in the roof fall. There were no flaked lithic tools in any of the floor features.

Within Room 3 there were 16 utilized flakes found mostly in the area south of the wingwall. Eleven of these were secondary flakes and 5 were tertiary. Five of these utilized flakes were located on Surface 1 and none were within feature fills.

There were 14 nonflaked lithic tools found in association with Room 3 made from basalt (1), diorite (1), quartzite (1) and sandstone (11). There were 2 metates, a mano, a hammerstone, a ground and polished stone of unknown use, and a large shaped slab.

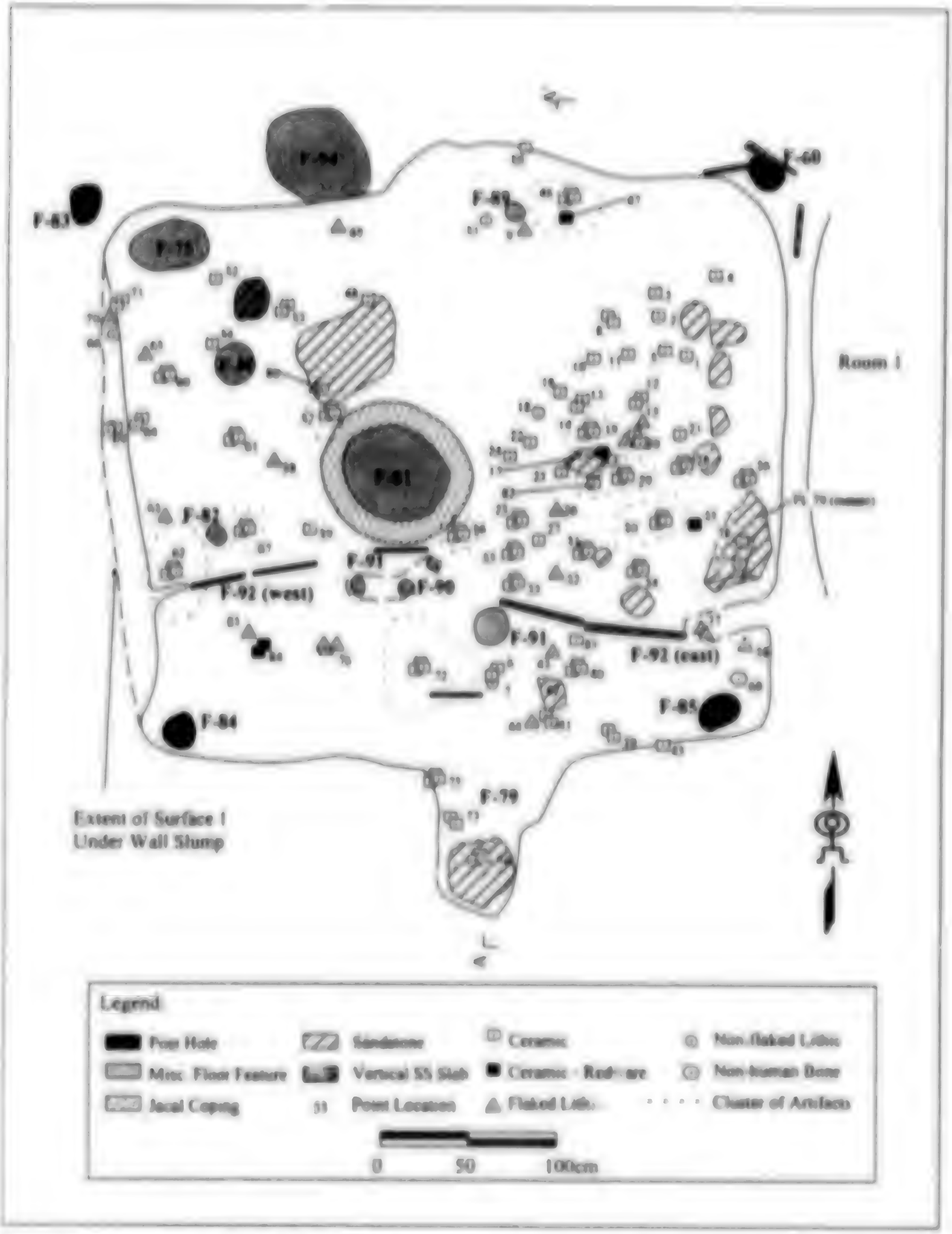


Figure 8.16. SMT10594, Room 3, Surface 1, with point located artifacts and associated features.

Key to Point Located Artifacts in 5MT10594, Room 3, Surface 1

PL#		Artifact Description
1	1	Gray Body Jar Sherd
2	1	Gray Body Jar Sherd
3	1	Gray Body Jar Sherd
4	1	Chapin Gray Jar Sherd
5	1	Chapin Gray Jar Sherd
6	1	Early Pueblo Red Bowl Sherd
	3	Polished White Bowl Sherds
	3	Gray Body Jar Sherds
7	1	Basalt Hamerstone
8	2	Gray Body Jar Sherds
9	1	Quartzite Tertiary Flake
10	1	Chapin Gray Jar Sherd
11	1	Gray Body Jar Sherd
12	2	Gray Body Jar Sherds
13	5	Gray Body Jar Sherds
14	10	Gray Body Jar Sherds
	1	Chapin Gray Jar Sherd
15	1	Basalt Core
16	1	Gray Body Jar Sherd
17	1	Abajo R/O Bowl Sherd
18	1	Basalt Hammerstone / Mano
19	1	Quartzite Tetiary Flake
20	2	Gray Body Jar Sherds
21	1	Gray Body Jar Sherd
22	1	Gray Body Jar Sherd
23	1	Gray Body Jar Sherd
24	2	Gray Body Jar Sherds
25	3	Gray Bod, Jar Sherds
26	1	Utilized Quartzite Secondary Flake
27	1	Gray Body Jar Sherd
28	1	Painted White Bowl Sherd
	26	Gray Body Jar Sherds
	4	Chapin Gray Jar Sherds
29	1	Chapin Gray Jar Sherd
	5	Gray Body Jar Sherds
30	13	Gray Body Jar Sherds
31	3	Gray Body Jar Sherds
	1	Chapin Gray Jar Sherd
32	1	Utilized Siltstone Secondary Flake
33	1	Gray Body Jar Sherd (smooth interior)
	3	Gray Body Jar Sherds
34	3	Gray Body Jar Sherds
35	1	Abajo R/O Bowl Sherd
36	5	Painted White Bowl Sherds
37	2	Utilized Siltstone Secondary Flakes
38	1	Utilized Siltstone Secondary Flake
39	1	Chapin Gray Jar Sherd
	2	Gray Body Jar Sherds
40	6	Gray Body Jar Sherds
41	1	Gray Body Jar Sherd

PL#		Artifact Description
42	1	Shaped Sandstone Slab
43	1	Flaked Lithic Debitage
44	1	Utilized Siltstone Secondary Flake
45	1	Chapin B/W Bowl Sherd
46	12	Gray Body Jar Sherds
47	1	Abajo R/O Bowl Sherd
48	1	Gray Body Jar Sherd
49	1	Utilized Chert Tertiary Flake
50	1	Quartzite Unshaped 1-Hand Mano
51	1	Ground/Polished Sandstone
52	1	Gray Body Jar Sherd
53	2	Gray Body Jar Sherds
54	1	Gray Body Jar Sherd
55	3	Gray Body Jar Sherds
56	5	Gray Body Jar Sherds
57	3	Gray Body Jar Sherds
58	1	Sandstone Tertiary Flake
59	1	Gray Body Jar Sherd
60	8	Gray Body Jar Sherds
61	11	Gray Body Jar Sherds
62	34	Gray Body Jar Sherds
63	1	Quartzite Tertiary Flake
64	3	Gray Body Jar Sherd
65	1	Utilized Siltstone Secondary Flake
66	1	Diorite Metate Fragment
67	6	Gray Body Jar Sherds
68	1	*Spermophilus sp.* Bone Fragment
69	2	Gray Body Jar Sherds
70	1	Quartzite Core
71	2	Gray Body Jar Sherds
72	105	Gray Body Jar Sherds
	2	Chapin B/W Bowl Sherd
	14	Chapin Gray Jar Sherds
73	1	Chapin B/W Bowl Sherd
	2	Gray Body Jar Sherds
74	2	Chapin B/W Bowl Sherd
	5	Gray Body Jar Sherds
75	1	Chapin Gray Jar Sherd
	2	Gray Body Jar Sherds
76	1	Utilized Siltstone Secondary Flake
	3	Siltstone Tertiary Flakes
77	1	Gray Body Jar Sherd
78	1	Gray Body Jar Sherd
79	1	Sandstone Metate
80	1	Gray Body Jar Sherd
	1	Chapin Gray Jar Sherd
81	3	Gray Body Jar Sherds
82	1	Gray Body Jar Sherd
83	1	Chert Assymetrical Biface
84	1	Abajo R/O Bowl Sherd
	1	Early Pueblo Red Bowl Sherd

Table 8.13. 5MT10594, Room 3 Flaked Lithic Tool Forms and Material Types

	Asymmetrical Biface	Chopper	Core	Hammerstone	Uniface	Utilized Flake
Basalt			1	1		
Chert	1	1				1
Quartzite			1		1	5
Siltstone	1					10

Table 8.14. 5MT10594, Room 3 Nonflaked Lithic Tool Forms and Material Types

	Ground/ Polished Stone	Hammerstone/Mano	Mano-Unshaped 1-Hand	Metate, Slab	Metate, Trough	Metate	Shaped Slab
Basalt		1					
Diorite						1	
Quartzite			1				
Sandstone	1			4	1		5

The shaped slab (PL. 42) was found on the floor near the north edge of the hearth. A hammerstone (PL. 18) and a large trough metate (PL. 79) were found together in a large cluster of sherds on the floor of Room 3 south of the wing wall. A fragment of another metate (PL. 66) was found across the room and an unshaped mano (PL. 50) was found at the north central end of the room. A piece of ground and polished tabular sandstone (PL. 51) was located very near this mano.

Forty-two pieces of flaked lithic debitage were recovered from all proveniences of Room 3. The most common material used was silicified siltstone (20), followed by quartzite (15), basalt (3) and chert (2), hornfels (1), and one sandstone spall. Sixty-two percent of the debitage consisted of tertiary flakes, 33% were secondary and only 5% were primary flakes.

Table 8.15. 5MT10594, Flaked Lithic Debitage Forms and Material Types

	Primary	Secondary	Tertiary
Basalt		3	
Chert		2	
Hornfels		1	
Quartzite	2	5	8
Sandstone			1
Siltstone		3	17

On the floor of Room 3 there were six pieces of flaked lithic debitage, three of which were quartzite, and three were siltstone. All of the floor debitage consisted of tertiary flakes mostly found south of the wingwall. The only feature containing any flaked debitage was the storage pit in the northwest corner of the room (Feature 75) where four pieces were found.

Pollen from Room 3

Six pollen samples were processed from Surface 1 of Room 3. Two samples (8 and 9) were taken from the north-east corner of the room; two samples (23 and 28) were taken from underneath slabs lying on the floor of the room; and two samples (25 and 27) were taken from behind the metate (PL.79) located on the floor along the east wall. In general there were low total pollen concentration values and relatively high percentages of indeterminate type of pollen. Corn pollen was present as well as some relatively high average concentration values for *Poaceae* and Cheno-am pollen.

Low amounts of corn pollen (25 grains/gm), *Artemisia*, *Ephedra*, *Pinus*, cheno-am, high spine *Asteraceae* (yucca), and *Poaceae* were found in the northeast corner of the room. *Pinus*, cheno-am, high spine *Asteraceae*, and *Artemisia* pollen were found in low amounts in samples from behind the metate along the east wall. The samples from underneath the slabs on the floor of the rooms were so extremely degraded that the pollen in them could not be identified.

Macrobotanical Samples from Room 3

A single macrobotanical sample, from the primary cultural fill of the hearth, contained three wood species. The wood was sagebrush/rabbitbrush, *Dicotyledoneae*, and juniper.

Faunal Remains from Room 3

Two mammal bones, from jackrabbit and mouse, were recovered from Room 3. The left ulna from a mouse (*Spermophilus sp.*) (PL. 68) was found on the floor in the northwest corner of Room 3. The distal metapodial from a jackrabbit (*Lepus*) was found in the fill. There were no faunal remains in the hearth or in any of the floor features.

Dendrochronological Dating Samples from Room 3

A total of 66 tree-ring samples were submitted for analysis. Fifty-eight of the samples were from either spruce or fir trees. Seven of the samples were from pinyon pine and 1 was from ponderosa pine. Unfortunately, none of the samples were datable because of a lack of rings.

Rooms 4, 5, and 7

Three small storage rooms were located adjacent to the north walls of Rooms 2 and 3 (Figure 8.17, Table 8.16). These rooms were part of the room suite of the primary site component. Room 4 was the smallest of the three storage rooms and Room 5 had the largest floor area. During the site investigation the area to the north of Room 2 was investigated for evidence of a storage room which was designated Room 6. The remains of Room 6 either did not exist or were not found.

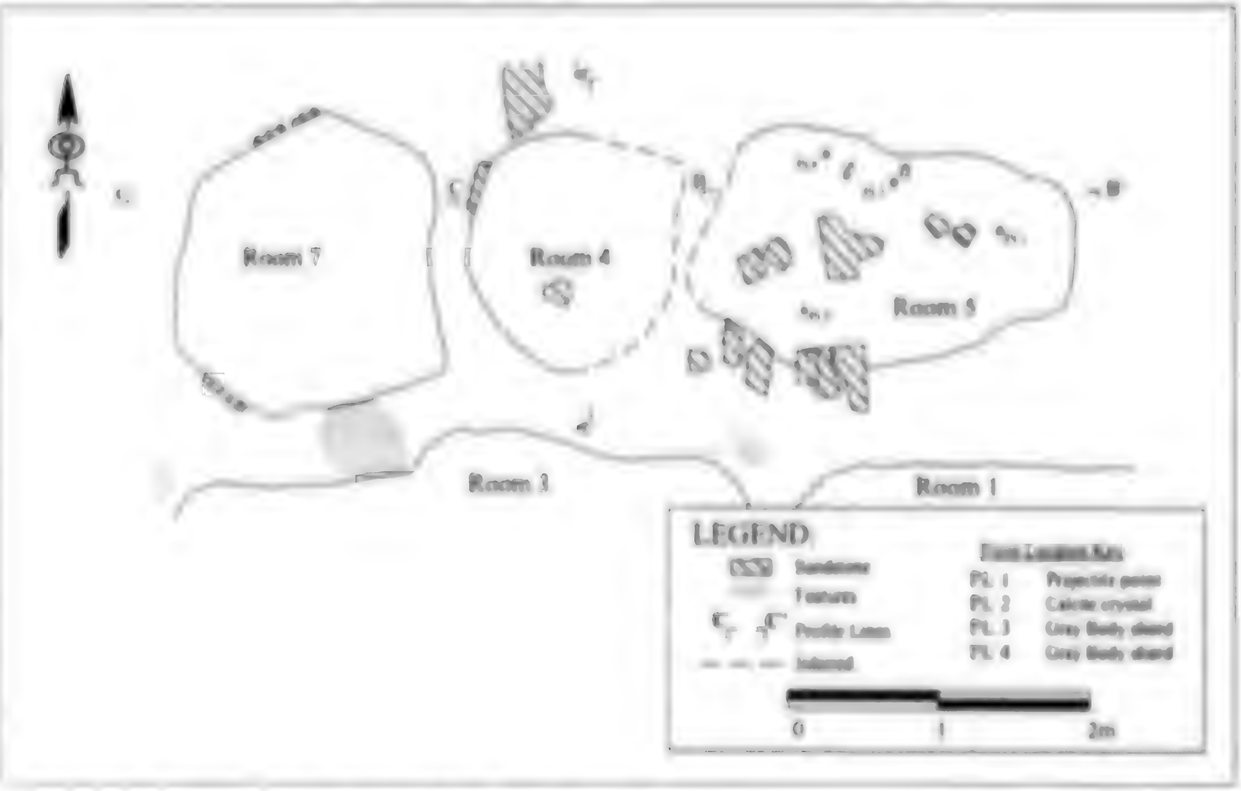


Figure 8.17. SMT10594, plan view of Rooms 4, 5, and 7.

Table 8.16. Dimensions of Rooms 4, 5, and 7 at Site 5MT10594

	Room 4	Room 5	Room 7
Length	1.58 m	2.61 m	2.00 m
Width	1.46 m	1.62 m	1.84 m
Area	1.77 m²	3.14 m²	2.87 m²

Stratigraphy of Rooms 4, 5, and 7

Burned roof fall had been deposited along the south wall of Rooms 4 and 7, extending approximately two thirds of the way across the floors towards their respective north walls. This roof fall clearly fell into these rooms from Room 3 to the south. Room 5, the easternmost room as well as the farthest from Room 3 did not contain roof fall. The main fill in Rooms 4, 5, and 7 consisted of washed in silty clays interspersed throughout with small bits and pieces of charcoal and oxidized soil (Stratum 2). All three structures were overlain by the sitewide eolian silty loam (Stratum 1)(Figure 8.18).

Construction of Rooms 4, 5, and 7

The only elements remaining in Rooms 4, 5, and 7 which were related to construction were a few upright slabs. Around the periphery of Room 7 there were 5 upright slabs still in place but no post sockets could be found. Another two slabs were still in place in Room 4. Numerous slabs of tabular sandstone were lying flat on the floor of Room 5.

Surface 1 Rooms 4, 5, and 7

The surfaces in these three rooms differed one from the other only in surface area and shape. They were all simply use compacted native soil with no modifications. None of the rooms contained any sort of floor features, and very little artifactual material on the floor.

Material Culture of Rooms 4, 5, and 7

In the fill of these three rooms the only cultural items found were either ceramics or flaked lithics. In Room 4 there were two ceramic sherds in the fill one of which was from a Chapin Gray jar. Room 5 contained four gray ware body sherds and 1 asymmetrical biface in the fill. In the fill of Room 7 there were 12 ceramic sherds and 1 flaked lithic unifacial tool. The ceramics consisted of 1 Abajo Red-on-orange bowl sherd, 1 Polished White bowl sherd, and 10 plain grayware body sherds. The unifacial tool was made of silicified siltstone.

There were few artifacts on the floor surface of these rooms. There were no artifacts in Room 7. On the floor of Room 4 there was a single sherd from a Chapin Gray jar. The floor of Room 5 contained the largest assemblage with 2 Gray Body sherds, 1 corner-notched quartzite projectile point, and 1 calcite crystal.

Chronology of Rooms 4, 5, and 7

The rooms were dated by ceramic typological cross-dating to A.D. 700-750 based on the presence of formal types Chapin Gray and Abajo Red-on-orange. The corner-notched projectile point is also characteristic

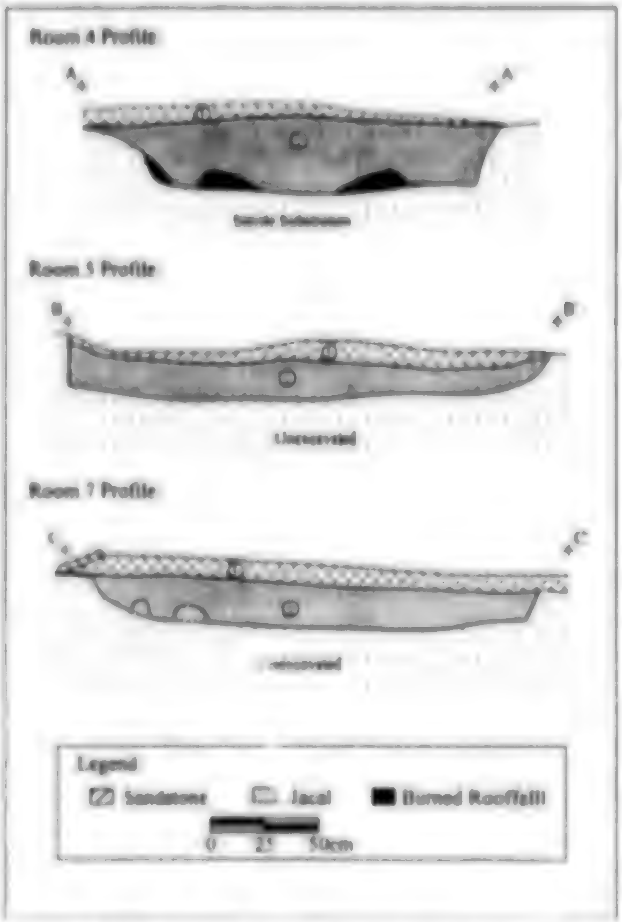


Figure 8.18. Profile views showing stratigraphy of Rooms 4, 5, and 7 at Site 5MT10594.

of this time period of Basketmaker III/Pueblo I. No other dating samples were taken.

Pollen Analysis Results from Rooms 4, 5, 7

Pollen samples were collected from the floors of all the storage rooms but only those from Room 7 were submitted for analysis due to budget constraints.

These samples were collected from three of the room corners since corners act as natural pollen traps. Sample 30, taken from the southeast corner, contained 3,252 grains/gm with 9.7% Indeterminate pollen. The sample was dominated by Cheno-am pollen with high *Poaceae* (144 grains/gm) and low *Pinus* (806 grains/gm). Corn pollen was recovered in amounts of 86 grains/gm.

Sample 31, taken from the southwest corner, contained a total pollen concentration value of 890 grains/gm with 28% Indeterminate pollen. *Pinus*, *Poaceae*, and Cheno-am pollen were present as was *Artemisia*. No corn pollen was found.

Sample 32 , taken from the northwest corner, contained 2,057 grains/gm total concentration with 5% indeterminate pollen. Cheno-am pollen was dominant (1163 grains/gm) with low *Pinus* (537 grains/gm), a trace of *Juniperus* (30 grains/gm), and high *Poaceae* (119 grains/gm). Corn was present in amounts of 60 grains/gm.

Faunal Remains, from Rooms 4, 5, and 7

There were no faunal remains associated with Rooms 4, 5, or 7, either in the fills or on the floors.

Courtyard 1 Segments 1, 2, and 3

The courtyard area located between the room block and Pitstructure 1 was roughly 3.5 m x 12 m or 42 m^2 in area. This area was not clearly bounded on the west and the old waterline access road bounds it on the east. This area was subdivided into three arbitrary segments for tighter spacial control in the event that features and/or activity areas were definable (Figure 8.2). Most of the courtyard area had eroded towards Pitstructure 1 to the south and no prehistoric use surface, activity areas, or features remained, if they had ever been present. This erosional process was clearly defined in the north south stratigraphic profile between Room 1 and Pitstructure 1 (Figure 8.19). The artifact bearing

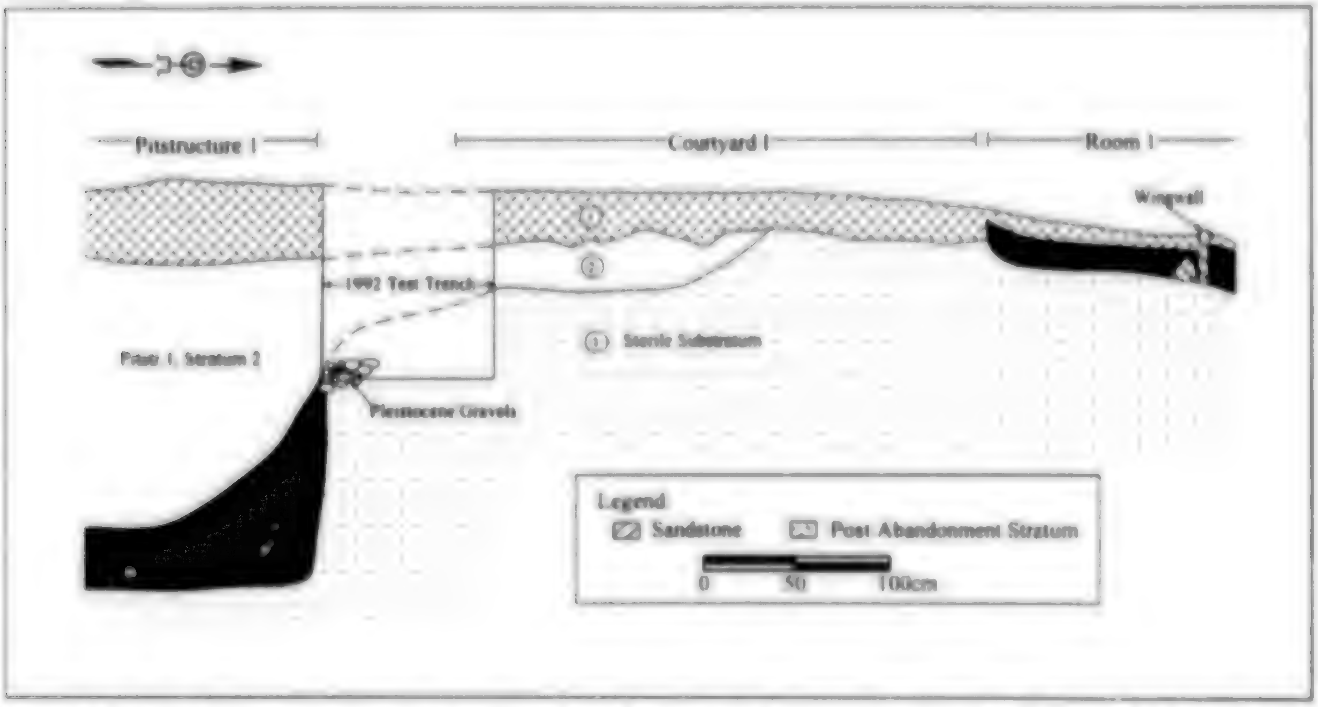


Figure 8.19. 5MT10594, stratigraphic profile oriented north-south across Courtyard 1, Segment 2, along the 189 east grid line.

strata gained in depth from north to south until they dropped off into the pitstructure (Figure 8.19).

Stratum 1 was the most recent post abandonment deposit over the entire site. This material consisted of a dark grayish brown silty clay loam with cultural inclusions. Stratum 2, a silty clay loam, was formed when a large segment of the north wall of Pitstructure 1 collapsed, which in turn hastened the erosion along the southern edge of the courtyard. This "scooped out" area was then the first to be filled as the midden was transported across the pitstructure and on to the courtyard area. Stratum 3 was a layer of undisturbed native sterile clays. Within this stratum there was a layer of Pleistocene gravels which was truncated by the inhabitants when they excavated the holes for Pitstructures 1 and 2. Fill contained within the southern alcove of Room 1 was a combination of construction materials from Room 1 and highly burned roof materials from Room 3 to the west.

Ceramics from Courtyard Area

A total of 681 ceramic sherds were collected from the courtyard area. Vessel forms represented by these ceramics were from bowls and jars.. One hundred sixty-four sherds were from bowls, 404 from jars and 113 from indeterminate vessel forms.

In the bowl category there were 4 Abajo Red-on-orange, 1 Bluff Black-on-red, 3 Chapin Black-on-white, and 5 Chapin Gray. Of the remaining 151 bowl sherds 8 were Early Pueblo Red, 1 Gray Body, 11 Painted White, and 131 Polished White.

In the jar category 19 were Chapin Gray, 3 Corrugated Body, 1 Early Pueblo Red, 307 Gray Body, 3 Painted White and 71 Polished white. Some vessels were represented by sherds too small to be identified as to their form. In this category there were 75 Gray Body sherds, 1 Early Pueblo Red, and 37 Polished White ware sherds.

The ceramics were all characteristic of the late BasketmakerIII/Early Pueblo I time period, with the exception of the Corrugated Body Sherds which were made after A.D. 900.

Lithics from the Courtyard Area

There were 7 flaked lithic tools, 2 nonflaked lithic tools, and 61 pieces of flaked lithic debitage found in the Courtyard Area.

A chopper, an asymmetrical biface, and five utilized flakes were the flaked lithic tools found in the Courtyard Area. The chopper was quartzite and the biface was made from silicified siltstone. Silicified siltstone was the most commonly used material. Two of the utilized flakes were secondary flakes and 3 were tertiary flakes.

A hammerstone and a fragment of a trough metate were the nonflaked lithic tools found in the Courtyard area. Both were made of sandstone.

A total of 61 pieces of flaked lithic debitage was recovered from the Courtyard area. Ten of these were primary flakes, 28 were secondary flakes, 19 were tertiary flakes, and 4 were shatter. The most common material represented was basalt (25), followed by quartzite (22), then chert (8), and finally silicified siltstone (6). In the primary flake category 5 of the flakes came from basalt, 4 were quartzite and 1 was silicified siltstone.

Pitstructure 1, Basketmaker III/Pueblo I Component

Length : 4.5 m

Width : 4.5 m

Depth : 1.4 m existing, 2.12 m inferred

Area : 20.59 m^2

Pitstructure 1 at 5MT10594 was the only pitstructure in the architectural suite which was finished and occupied. The main chamber was rectangular with rounded corners and was at least 1.4 m deep. There was a ventilator shaft in the southern part of the structure. There were 39 features associated with the occupation floor surface.

Stratigraphy of Pitstructure 1

There were three main layers of deposits in Pitstructure 1 (Figure 8.20). The deepest layer, Stratum 3, consisted of a matrix of a gray brown silty clay with inclusions of charcoal flecks and chunks (less than 2 cm), as well as flecks of caliche. Near the walls there were masses of near sterile soil intermixed with Pleistocene gravels. Directly above the floor there were large quantities of adobe mixed with a few rotted poles and numerous tabular sandstone slabs. The slabs were concentrated in a 3.6 m^2 area around the hearth.

Stratum 2 was a thick wind and water deposit lying directly above Stratum 3. This matrix was a gray silty clay with a high density of charcoal fragments, small oxidized fragments of sandstone and caliche flecks. Most of the water deposited sediments, which appeared as distinct bands, were concentrated in the lower 50 cm of Stratum 2. The lower 50 cm also contained burned structural material particularly in the northern half of the structure. The Pueblo II component of 5MT10594 was found in Stratum 2 and is discussed in a separate section of this chapter.

Stratum 1 was the uppermost stratum which not only covered Pitstructure 1 but the entire site. This stratum was a matrix of gray brown silty loam with inclusions consisting of roots, charcoal flecks, small fragments of sandstone, and caliche flecks. Cultural material in the form of ceramics and flakes was present in both Stratum 1 and 2. The uppermost 10 cm of Stratum 1 was primarily made up of forest duff.

Construction of Pitstructure 1

The depth of Pitstructure 1 averaged 1.2 meters. However, the prehistoric original construction depth from prehistoric ground surface to the floor appears to

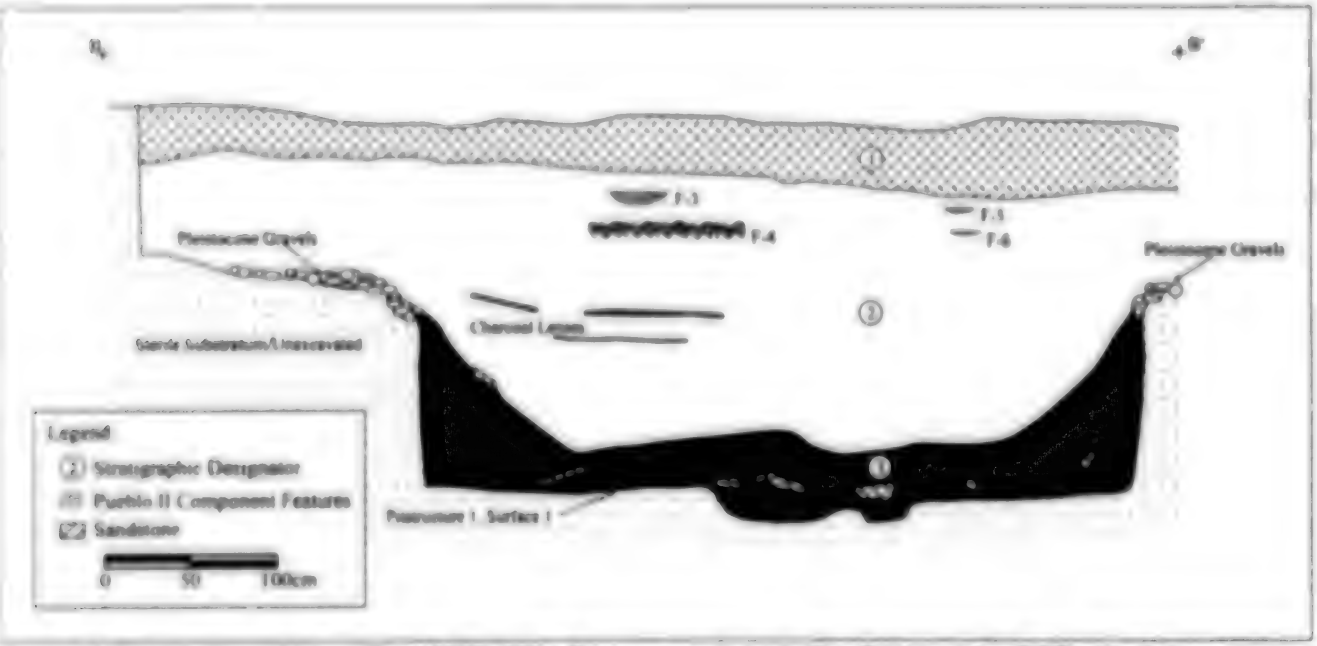

①
F-3
F-4
F-5
F-6
Pleistocene Gravels
Pleistocene Gravels
②
Charcoal Lenses
Sterile Substratum/Unexcavated
③
Pitstructure 1, Surface 1
Legend
② Stratigraphic Designator
Pueblo II Component Features
Sandstone
0
50
100cm

Figure 8.20. Stratigraphic profile of 5MT10594, Pitstructure 1, including Basketmaker III/Pueblo I Component and Pueblo II Component features.

have been deeper, probably 2.12 m. The actual rim of the vertical shaft of the ventilator was 1.95 m above the floor of the horizontal ventilator tunnel, which was in turn 17 cm above Surface 1 in the main chamber.

The only remaining evidence of the roof was four postholes (Features 50, 51, 55, and 56). The diameter of the post sockets and depth, indicated that they once contained the main support posts for a roof framework. The four post sockets were located in the four corners of the house and the two southern posts (Features 50 and 51) were incorporated into the construction elements of the wing wall. The floor of the pitstructure was constructed with a variety of features including a hearth, wingwall, post support sockets, bell shaped pits, sipapu, and the ubiquitous small, cylindrical, sand filled pits (Figure 8.21).

Surface 1 and Floor Features of Pitstructure 1, Component 1

The floor surface of Pitstructure 1 was simply native soil compacted by use with no plaster coating. The surface was relatively flat in cross section, curving up slightly where it met the walls. The floor area north of the wingwall averaged 5 to 10 cm lower than the floor south of the wingwall and deflector.

There were 39 features associated with this surface (Table 8.17). There were 4 post holes; 6 pot rests; 11 sand filled pits; 4 small pits; 6 storage pits; 2 warming pits; 2 sipapus; a hearth; a wingwall and deflector; 9 ladder rests; and a ventilator shaft.

Post Holes Pitstructure 1

There were only four post holes associated with Surface 1. The fill of all the post holes contained post abandonment water deposited sediments intermixed with charcoal flecks, and no artifactual material. Features 50 and 51 were the southeast and southwest main support sockets respectively, and Features 55 and 56 were the northwest and northeast main support sockets. The southern post sockets formed the western and eastern ends of the wingwall. The two northern post sockets were free standing. It is interesting to note that the depth of the southern posts averaged 47 cm, while the northern posts averaged only 33 cm, in depth.

Pot Rests in Pitstructure 1

Six, small, basin shaped, sand filled pits were defined as pot rests (*sensu* Morris 1939). Five of the six features were found in the western half of the structure and the sixth on the east central side near a warming pit. On the western side Features 57 and 45 were the largest against the north and west walls respectively. Two of the smaller pot rests were between 55 cm and 75 cm due west of the central hearth. The fill in all of the pot rests was sand, usually of a reddish brown color.

Sand Filled Pits in Pitstructure 1

There were 11 sand filled pits associated with Pitstructure 1. The pits were all together in a nice neat row along the face of the north wall (Figure 8.22). Eight of the 11 pits were shallow basins exactly like pot rests. The remaining three were deeper but would still be called basin shaped. The only artifact in any of these features was a single non utilized tertiary flake in Feature 33.

Pits in Pitstructure 1

Four small pits (Features 65, 66, 69, 70) were found in the area west of the central hearth. Features 65 and 69 were truly cylindrical in cross section and Feature 66 was cylindrical originally and when remodeled became a basin with a deeper dimple in the middle. Feature 70, in cross section, was slightly bell shaped. The pits were similar in several respects: their small size, deposits of 1 to 4 levels of sand, and lack of artifacts.

Storage Pits in Pitstructure 1

There were six pit features (Features 44, 46, 47, 49, 52, 62) on the floor of Pitstructure 1 which by their morphology rather than content were assigned a storage function. All of these features were large in size, bell shaped to some degree, and had rounded interiors with no sharp edges.

Feature 44 was located in the southeast corner of Pitstructure 1. At floor level it appeared as a circular stain much like a post socket. Upon excavation, the feature proved to be a cavity that angled down and back so that it passed behind the vertical plane of the pithouse wall. The fill consisted of two distinct strata of cultural trash in a matrix of silty loam. The

Table 8.17. 5MT10594, Pitstructure 1, Surface 1 Feature Dimensions

Feature#, Description	Length (cm)	Width (cm)	Depth/Height (cm)
30, Sand filled pit	8	8	7
31, Sand filled pit	9	10	7
32, Sand filled pit	9	9	6
33, Sand filled pit	7	8	4
34, Sand filled pit	7	8	4
35, Sand filled pit	9	9	4
36, Sand filled pit	9	9	5
37, Sand filled pit	9	9	5
38, Sand filled pit	12	11	7
39, Sand filled pit	6	6	3
40, Central hearth	72	65	15
41, Wing wall	205	2 to 5	H=5 to 31
42, Vent shaft	270	125	195
44, Bell shaped pit	47	32	30
45, Pot rest	21	19	4
46, Storage pit	35	28	27
47, Bell shaped pit	60	50	43
48, Sand filled pit	7	7	3
49, Storage pit	52	46	18
50, SE Main support post	29	29	50
51, SW Main support post	41	39	44
52, Storage pit	51	43	24
53, Pot rest	23	23	10
54, Pot rest	11	9	3
55, NW Main support post	31	31	31
56, NE Main support post	30	24	35
57, Pot rest	19	18	7
58, Warming pit	25	23	2
59, Sipapu	20	17	5
61, Ladder rest sockets	45	30	2 to 8
62, Bell shaped pit	24	20	16
65, Pit	11	7	8
66, Pit	12	11	5
67, Pot rest	11	11	3
68, Pot rest	9	7	2
69, Pit	9	7	6
70, Pit	10	9	9
73, Sipapu	14	13	21
74, Warming pit	37	33	10

cultural material present consisted of a few ceramic sherds, a biface fragment, a core, and fragments of ground stone. The greatest number of these items were located in the uppermost 20 cm of fill.

Feature 49 was another storage pit in the southwest corner of Pitstructure 1. This pit was a large oval construct 18 cm deep with slightly belled sides. The fill in this feature was relatively clean post abandonment wash and upper wall slump. A large sandstone slab was found in the upper fill of Feature 49 and the tip of a large bedrock boulder extruded into the feature from the west.

Feature 46 was located in front of the north wall near the northwestern corner of the pitstructure. It was a bell shaped pit 27 cm deep, which was filled primarily

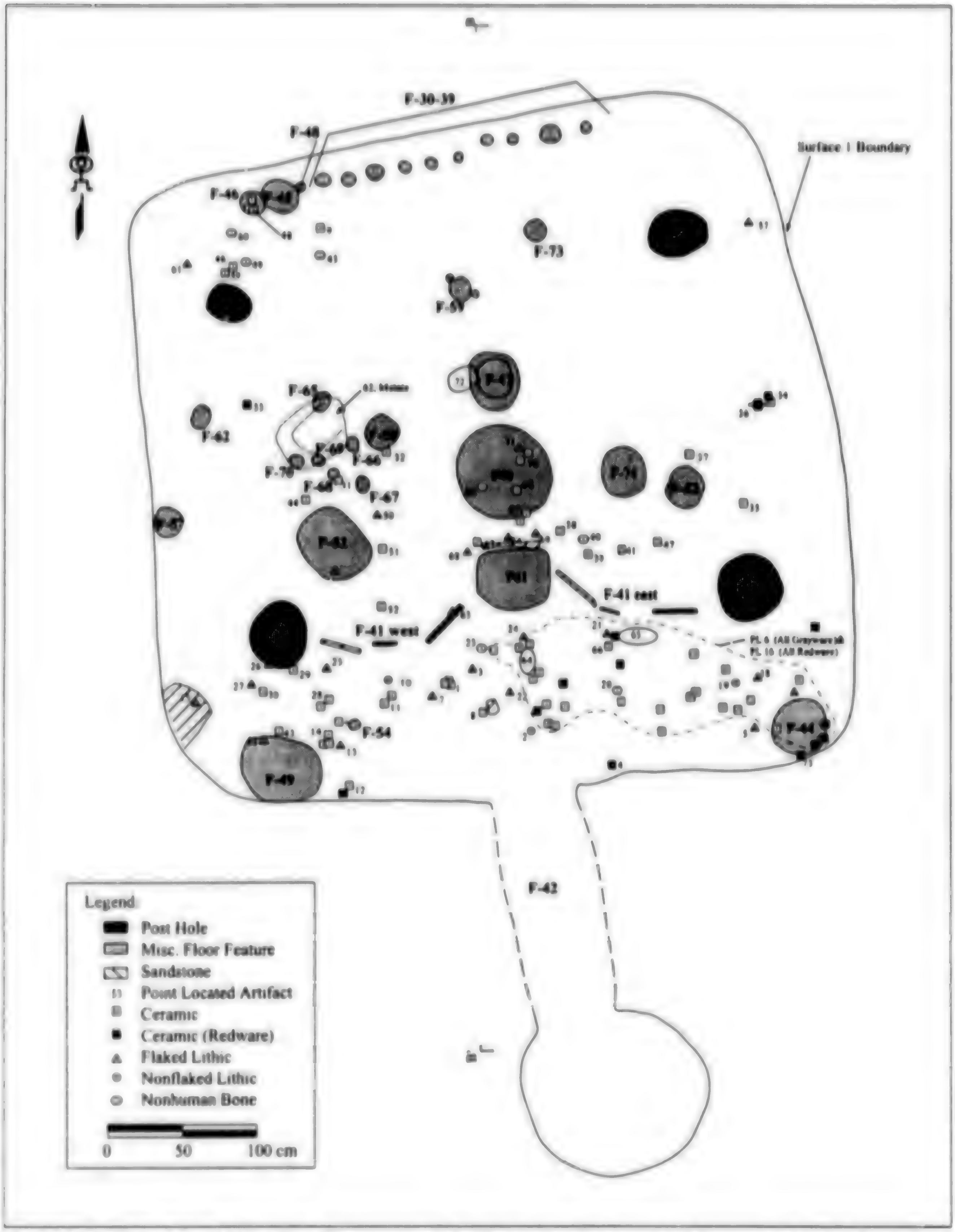


Figure 8.21. Plan view of 5MT10594, Pitstructure 1, Surface 1, showing associated features and point located artifacts.

Key to Point Located Artifacts in 5MT10594, Pitstructure 1, Surface 1

PL#	Description	
1	1	Gray Body Jar Handle Sherd
	5	Polished White Bowl Sherds
2	1	Diorite Unshaped 1-Hand Mano
3	1	Chert Assymetrical Biface
4	2	Abajo R/O Bowl Sherds
5	1	Utilized Quartzite Primary Flake
6	3	Chapin Gray Jar Sherds
	39	Gray Body Jar Sherds
	1	Gray Body Indeterminate Sherd
7	1	Utilized Quartzite Tertiary Flake
8	16	Gray Body Jar Sherds
9	1	Gray Body Jar Sherd
10	1	Siltstone Hammerstone
11	3	Gray Body Jar Sherds
12	2	Gray Body Jar Sherds
	2	Abajo R/O Bowl Sherds
13	1	Utilized Quartzite Secondary Flake
14	2	Gray Body Jar Handle Sherds
	6	Chapin Gray Jar Sherds
	16	Gray Body Jar Sherds
15	1	Utilized Quartzite Secondary Flake
16	1	Abajo Polychrome Bowl Sherd
	5	Abajo R/O Bowl Sherds
	3	Early Pueblo Red Bowl Sherds
17	1	Chert Tertiary Flake
18	1	Siltstone Secondary Flake
19	1	Sandstone Ground/Polished Stone
20	1	Jackrabbit (*Lepus sp.*) Rib Fragment
21	1	Utilized Quartzite Tertiary Flake
	1	Quartzite Secondary Flake
22		Unspecified Flaked Lithic
23	1	Utilized Siltstone Secondary Flake
	1	Quartzite Tertiary Flake
24	1	Sandstone Tertiary Flake
	1	Quartzite Tertiary Flake
25	1	Utilized Chert Tertiary Flake
26	1	Utilized Claystone Tertiary Flake
27	1	Utilized Quartzite Tertiary Flake
28	1	Chapin Gray Jar Sherd
	9	Gray Body Jar Sherds
29	2	Gray Body Jar Sherds
30	1	Gray Body Jar Sherd
31	1	Gray Body Jar Sherd
32	1	Gray Body Jar Sherd
33	1	Abajo R/O Bowl Sherd
34	4	Gray Body Indeterminate Sherds
	1	Abajo R/O Bowl Sherd
35	1	Early Pueblo Red Bowl Sherd
36	1	Malachite
37	4	Gray Body Indeterminate Sherds
38	1	Unspecified Ceramic
39	1	Polished White Bowl Sherd
40	1	Bighorn Sheep (*Ovis cadensis*) Left Lateral Malleolus
41	1	Chapin B/W Bowl Sherd
	3	Gray Body Jar Sherds
42	1	Siltstone Core
43	1	Chapin B/W Bowl Sherd
44	1	Gray Body Jar Sherd
45	1	Indeterminate Medium Mammal Rib Frag.
46	1	Painted White Bowl Sherd
47	1	Early Pueblo Red Bowl Sherd
48	26	Chapin B/W Bowl Sherds
	6	Chapin Gray Jar Sherds
	1	Gray Body Jar Sherd
49	1	Cottontail (*Sylvilagus sp.*) Flange
50	1	Utilized Chert Tertiary Flake
51	4	Gray Body Jar Sherds
52	1	Gray Body Jar Sherd
53	1	Quartzite Tertiary Flake
54	1	Siltstone Assymetrical Biface
55	1	Polished White Bowl Sherd
	1	Gray Body Jar Sherd
	1	Gray Body Indeterminate Sherd
56	2	Gray Body Jar Sherds
57	1	Quartzite Tertiary Flake
58	1	Indeterminate Med. Mammal Rib Frag.
	2	Indeterminate Med. Mammal Long Bone Fragments
59	3	Chapin B/W Bowl Sherds
60	2	Indeterminate Mammal Bone Fragments
61	1	Quartzite Tertiary Flake
62	1	Sandstone Trough Metate
63	1	Utilized Siltstone Secondary Flake
64	4	Chapin Gray Jar Sherds
	5	Gray Body Jar Sherds
65	4	Abajo R/O Bowl Sherds
66	1	Gray Body Jar Sherd
67	1	Gray Body Bowl Sherd
68	1	Utilized Chert Tertiary Flake
	1	Quartzite Tertiary Flake
69	1	Utilized Chert Tertiary Flake
70	1	Painted White Bowl Sherd
	1	Gray Body Jar Sherd
	1	Polished White Jar Sherd
71	1	Utilized Chert Tertiary Flake
	1	Utilized Quartzite Tertiary Flake
72	1	Sandstone Slab Metate
73	2	Abajo Polychrome Bowl Sherds

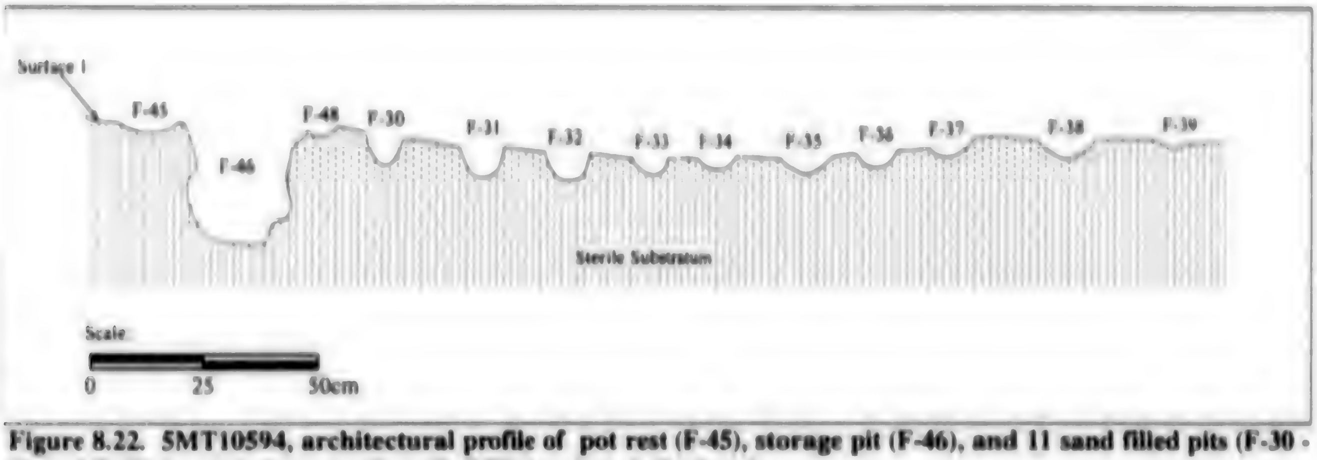


Figure 8.22. 5MT10594, architectural profile of pot rest (F-45), storage pit (F-46), and 11 sand filled pits (F-30 - 39 and F-48) located along north wall of Pitstructure 1, Surface 1.

with different lenses of sand. The lowermost 19 cm consisted of two strata of brown and grayish brown sand interspersed with charcoal flecking. Above the sand the feature was sealed over with an 8 cm thick plug of adobe.

Feature 47 was a rather elaborate bell shaped pit located directly north of the central hearth (Figure 8.23). At floor level there was a shallow rectangular pit. In the middle of the rectangular area there was a circular hole which belled out after the first 10 cm . The pit reached an overall depth of 43 cm. The feature was filled with a homogeneous matrix of yellowish gray silty sand, with occasional charcoal bits. The sandy matrix also contained three fragments of ground stone. In the center of the fill was part of a Chapin Black-on-white bowl which had abrasive ware along the edge indicating that it had been used as a scoop. Other artifacts within this fill included 9 sherds, and 1 asymmetrical biface.

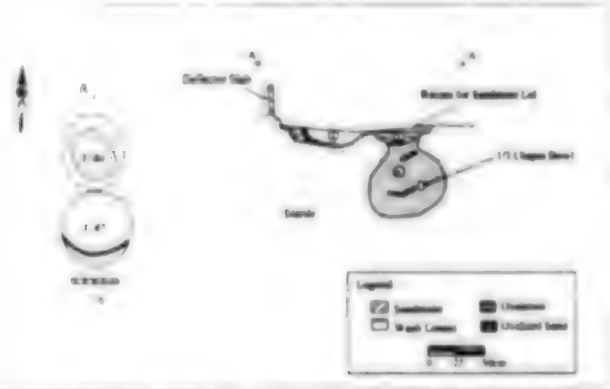


Figure 8.23. 5MT10594, plan and profile views of Feature 40 (storage pit) and Feature 47 (central hearth).

Feature 62 was a medium-sized basin shaped storage pit near the center of the west wall. This feature was filled with alternate layers of post abandonment wash lenses intermixed with sand. The sand admixture probably washed in from the surrounding floor surface. There was no artifactual material within Feature 62.

Feature 52 was a medium sized basin shaped storage pit that was deliberately filled with sand. The entire interior surface of the feature had been lined with a thin slip of gray clay. There were 5 bowl sherds, and two tertiary flakes (one of which was utilized) in the upper 1 cm of fill.

Warming Pits in Pitstructure 1

Two features, 58 and 74 were warming pits. Feature 58 was a square feature with rounded corners and a very shallow basin shape in profile. It was located 40 cm northwest of the hearth. The matrix within this depression was reddish oxidized sand, interspersed with small fragments of oxidized sandstone.

The other warming pit (Feature 74) was located 40 cm northeast of the central hearth. On the floor of this feature there was a 1 cm lens of charcoal superimposed by 9 cm layer of fine tan sand interspersed with charcoal bits. Within this 9 cm lens of tan sand were two stacked fragments of oxidized sandstone.

Sipapu Features in Pitstructure 1

There were two features near the north end of the north/south axis of this structure that probably were sipapus. Features 59 and 73 were both found in the area between the central hearth and the north wall and both possessed attributes which set them apart from other similar features.

Feature 59 was a sand filled basin with four smaller sand filled pits along its edges (Figure 8.24). These small sand filled pits, in or near a sipapu have been defined as pits where prayer sticks were placed or anchored during ritual observances (Brisbin 1986: 668-669).

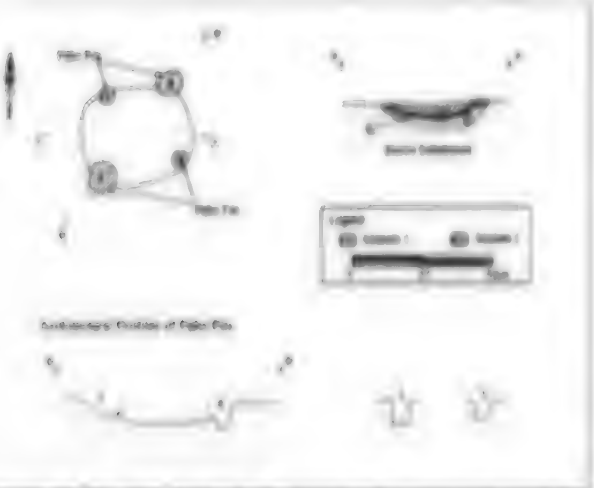


Figure 8.24. 5MT10594, Feature 59, sipapu complex showing four paho pits and main feature.

Feature 73 was located 50 cm northeast of Feature 59. This feature had the classic appearance of a sipapu. It was a circular sand filled cylindrical pit 14 cm in diameter and 21 cm deep. A thin gray coat of plaster had been applied around the lip and upper interior surface of the pit. The lowermost 14 cm was a relatively clean deposit of light tan silty sand. The uppermost 7 cm was an adobe plug made with a mixture of native clay and sand.

Central Hearth in Pitstructure 1

The central hearth, Feature 40, was located north of the central portion of the wingwall, and 13 cm north of the deflector slab which was an integral part of the wingwall. It was a well oxidized, basin shaped, ash filled pit with no stone used in its construction. A single remodeling episode in the hearth reduced the north/south diameter by 10 cm. This was accomplished by removing all the ash from the hearth except the southern 10 cm. This exposed face of ash was covered with sand which eventually was oxidized by heat from the hearth fires (Figure 8.23).

Wingwall and Deflector in Pitstructure 1

The wingwall (Feature 41) which separated the main living room from the southern third of the structure had a core consisting of seven vertical slabs. These slabs began at the interior face of two southern roof support sockets and curved towards the hearth. The central slab was placed parallel to the back (south) of the hearth and acted as a deflector. Adobe, which at one time had probably formed a low continuous wall between the two southern roof support sockets, had washed off the slabs both north and south of the wingwall (except at the extreme base of the slabs) pooling on the floor surface. This made definition of the true floor surface very difficult since the adobe was nearly identical to the sterile soil of the floor.

Ladder Rests in Pitstructure 1

Directly south of the deflector slab there was a cluster of nine small basin shaped pits that were interpreted as ladder rests. Two of these features which were the best defined were found directly behind and at each end of the deflector slab. These two features were cylindrical in profile and 6 cm in depth. They were both filled with brown silty sand with charcoal fleck inclusions. Directly south of each of these well defined features were two clusters of shallow, closely spaced circular basins. The western cluster consisted of four such features, and the eastern three.

Vent Shaft in Pitstructure 1

From the center of the south wall, a horizontal tunnel extended to the south by southeast for 1.6 m. At this point the tunnel entered onto the floor of the vertical portion of the vent shaft, which rose approximately 2 m to the prehistoric ground surface. The entrance to the horizontal tunnel from the main room measured 45 by 50 cm. The horizontal tunnel gradually expanded in width and height until it measured 75 cm in width and 60 cm in height where it met the vertical shaft. Its average diameter at the top was 1.3 m and 1.17 m at the base. The floor of the horizontal shaft was somewhat basin shaped with a well defined lip at the interior mouth (Figure8.6).

The fill of the ventilator shaft consisted of post abandonment alluvial wash interspersed throughout with cultural trash. The trash content probably was mostly derived from the midden area located directly south of the pitstructure. After the site was abandoned the first cavity to be encountered by midden deposits washing back down the slope would have been the mouth of the vertical shaft.

The trash fill consisted of 38 ceramic sherds, of which 15 were bowls, 21 jars, 1 seed jar, and 1 indeterminate vessel form. Also in the assemblage were 1 core tool, 1 hammerstone, 1 shaped two hand mano, 1 unshaped mano, and 1 small fragment of ground stone.

Material Culture in Pitstructure 1

Altogether this pitstructure contained 929 artifacts and animal bone. In the ceramic category there were 744, 15 flaked lithic tools, 17 nonflaked lithic tools, 140 pieces of flaked lithic debitage, and 13 pieces of animal bone.

Ceramics in Pitstructure 1

There was a total of 744 ceramics recovered from the fill and floor of Pitstructure 1. The artifactual material associated with the Pueblo II episode which took place in the upper fill of this structure is discussed with that component.

The overwhelming majority of the typed sherds (N=145) consisted of Chapin Black-on-white, and Chapin Gray. These two types each represented 36% (combined 72% of the total assemblage). These were followed by Abajo Red-on-orange at 21%, Piedra Black-on-white at 4.1%, and Abajo Polychrome at 3.4%.

The only typed category present in the overall assemblage that was not present on the floor was Piedra Black-on-white. Chapin Black-on white was the most represented in the floor assemblage at 45%. This was followed by Chapin Gray at 29%, Abajo Red-on-Orange at 22% and Abajo Polychrome at 4.3% (Figure 8.21).

Table 8.18. 5MT10594, Pitstructure 1 Ceramic Types and Forms

	Jar	Bowl	Seed Jar	Jar Handle	Indeterminate	%
Plain Gray Body (378)	335	5		4	34	50.8
Chapin Gray (52)	47	1	3	1		7
Painted White (13)	2	11				1.7
Polished White (180)	60	106			14	24.2
Chapin B/W (52)	1	51				7
Piedra B/W (6)		6				0.8
Early Pueblo Red (24)		20			4	3.2
Abajo R/O (30)	1	29				4
Abajo Polychrome (5)		5				0.7
Indeterminate (4)					4	0.5
N= 744	446	234	3	5	56	
%	60	31.5	0.4	0.7	7.5	

Lithic Material in Pitstructure 1

There were 30 flaked lithic tools, 17 nonflaked lithic tools, and 124 pieces of flaked lithic debitage found in the fill and on the floor of Pitstructure 1.

A total of thirty flaked lithic tools were recovered from the floor and fill of Pitstructure 1 (Table 8.19). On the floor surface there were 2 asymmetrical bifaces, 1 core tool, and 15 utilized flakes. Of the two asymmetrical biface tools, one was made from chert, and the other from silicified siltstone The core was also made from silicified siltstone. The remaining eighteen flaked lithic tools were found in the structure fill above the floor: 3 cores, 1 abrader, 1 chopper, and 1 graver, and 12 utilized flakes.

A total of 17 nonflaked lithics were recovered from Pitstructure 1 (Table 8.20). Five of these items were on the floor, 9 were in features, and the remainder were in the fill. Most of these seventeen items were small fragments of an actual tool. Sandstone was the most common material type used to construct these tools. There were 7 sandstone metate fragments. There were 3 sandstone manos, one of which was a shaped two-hand mano. Four additional sandstone items were present: 1 ground and polished stone, 1 trough metate with one closed end, and two items whose function could not be determined. There were three additional material types represented in the groundstone tool category: a one-hand unshaped diorite mano, a shaped 2-hand quartzite mano, and a siltstone hammerstone. Five

Table 8.19. 5MT10594, Pitstructure 1 Flaked Lithic Tool Forms and Material Types

	Abrader	Asymmetrical Biface	Chopper	Core	Graver	Hammer-stone	Utilized Flake	%
Basalt (4)				3		1		12.9
Chert (10)		1	1	1	1		6	32.2
Claystone (1)							1	3.2
Quartzite (9)				1		1	7	29.0
Sandstone (1)	1							3.2
Siltstone (6)		3		1			2	19.4
N=31	1	4	1	6	1	2	16	
%	3.2	12.9	3.2	19.3	3.2	6.4	51.3	

Table 8.20. 5MT10594. Pitstructure 1 Nonflaked Lithic Tool Forms and Material Types

	Ground/ Polished Stone	Hammer-stone	Mano Shaped 2-hand	Mano	Mano Unshaped 1-hand	Metate Slab	Metate Trough	Metate	Other
Diorite					1				
Quartzite			1						
Sandstone	1		1	2		4	1	3	1 Pecked and Ground Slab
Siltstone		1							

of the nonflaked lithic artifacts were found on Surface 1 of Pitstructure 1. An unshaped one hand mano (PL.2), a hammerstone (PL.18), and a ground /polished stone (PL.19) were found on the floor south of the wingwall. The metate (PL.62) was west of the hearth and 3 cm to 5 cm above the floor. The pecked and ground slab (PL.72) was along the west edge of a bell shaped pit (Feature 47).

In the flaked lithic debitage assemblage, quartzite was the most common material type represented (Table 8.21). This material accounted for 42% of the total of 544 pieces of debitage. Next in abundance was chert which accounted for 29% of the debitage, followed by basalt at 18%. The remaining material types were chalcedony, limestone, sandstone, and siltstone, none of which accounted for more than 4% of the assemblage. The most common flakes, at 61%, were secondary, followed by tertiary at 24%. There were only 18 (14%) primary flakes. There were 10 pieces of flaked lithic debitage, lying on the floor surface of Pitstructure 1. Tertiary flakes accounted for 8 of these and 2 were secondary flakes.

Table 8.21. 5MT10594, Pitstructure 1 Flaked Lithic Debitage Forms and Material Types

	Primary	Secondary	Tertiary	Shatter	%
Basalt (24)	5	15	4		18.9
Chalcedony (2)	1	1			1.6
Chert (37)	3	21	12	1	29.1
Limestone (2)	1	1			1.6
Quartzite (54)	5	37	12		42.5
Sandstone (4)	1	2	1		3.1
Siltstone (4)	2	1	1		3.1
N=127	18	78	30	1	
%	14.1	61.4	23.6	0.8	

Pollen Samples from Pitstructure 1, Basketmaker III/ Pueblo I Component

A total of 7 pollen samples were processed from the floor of Pitstructure 1. All samples had high Cheno-am to low *Pinus* (pine) ratios and all but one sample contained corn. Samples 3, 12, and 13 were general floor scrapes from the southern third of the room. Sample 5 came from the northwest corner of the pitstructure. Samples 7 and 17 were taken from underneath slabs lying on the floor. And Sample 6 was taken from beneath the metate west of the central hearth.

Sample 3, floor scrape, contained a total pollen concentration value of 1,091 grains/gm with 26% Indeterminate pollen. The assemblage was dominated by Cheno-am pollen (417 grains/gm) with low amounts of *Pinus* grains (225grains/gm). Traces of *Asteraceae* (yucca) were present (32 Grains/gm) and a small amount of *Zea mays* (corn) pollen was observed (14grains/gm).

Sample 12 , floor scrape, contained 2,016 grains/gm concentration with 1% Indeterminate pollen. Cheno-am was high at 1,071 grains/gm and *Pinus* was low at 535 grains/gm. *Poaceae* (grass) pollen was high (157 grains/gm), with small amounts (63 grains/gm) of *Asteraceae* and *Artemesia* (sagebrush). *Platyopuntia* (prickly pear cactus) pollen was present (63 grains/gm), and corn was present (31 grains/gm).

Sample 13, floor scrape, contained 1,450 grains/gm total pollen concentration with 5% Indeterminate pollen. Cheno-am was dominant (675 grains/gm) with low *Pinus* (465 grains/gm) and *Poaceae* (82 grains/gm). *Artemisia* pollen was present (55 grains/gm). A trace of *Platyopuntia* pollen was present at 4 grains/gm. Corn pollen was present at 4 grains/gm.

Sample 5 was taken from the northwest corner on Surface 1. This sample contained 1291 grains/gm total pollen concentration with 7.3% Indeterminate. Cheno-am at 850 grains/gm was dominant, with low *Pinus* (252 grains/gm) and grass pollen (63 grains/gm). Corn pollen was present with 31 grains/gm.

Two samples (7 and 17) were taken from underneath slabs lying on the floor. Sample 7 was taken from the west half of the structure and Sample 17 was taken from the north central floor area between the two sipapus. Sample 7 contained 1,201 grains/gm total pollen concentration with 26% Indeterminate pollen. Cheno-am was dominant (498 grains/gm) with low amounts of *Pinus* (381 grains/gm) and grass pollen (88 grains/gm). *Artemisia* pollen was present (59 grains/gm). No corn pollen was present in Sample 7. Sample 17 contained a total pollen concentration of 1007 grains/gm with 28% Indeterminate pollen. *Pinus* and Cheno-am pollen were low (345 and 317 grains/gm respectively). Corn pollen was present but low at 6 grains/gm.

Sample 6 was taken from beneath the metate which was the central feature of Activity Area 4. Sample 6 contained 1562 grains/gm total pollen concentration with 24% Indeterminate pollen. Cheno-am pollen (512 grains/gm) dominated with low *Pinus* (458 grains/gm). A small amount of grass was present (81 grains/gm) as well as low spine *Asteraceae*, *Artemisia*, and *Sarcobatus* (greasewood). A trace of *Sphaeralacea* (globe mallow) pollen was present (2 grains/gm), and corn was present in amounts of 27 grains/gm.

All of the samples had a high Cheno-am to low pine ratio. Yucca pollen was present only in the southwest corner and beneath the metate in Activity Area 4. Corn pollen was found in all but the west central portion of the house. Grass pollen was present in all samples except in the sipapu area. Both sagebrush and prickly pear cactus were present in small quantities. Pollen from greasewood, and globe mallow was only found in the ritual area between the two sipapus.

Faunal Remains from Pitstructure 1

There were 18 prehistoric faunal remnants recovered from the fill, Surface1, and features of Pitstructure 1. The three bones found within the fill were of cottontail (*Sylvilagus sp.*) and jackrabbit (*Lepus sp.*). Eleven bones were associated with Surface 1, including one cottontail, four jackrabbit, one bighorn sheep (*Ovis canadensis*), three indeterminate medium mammal rib and long bone fragments, and two indeterminate mammal bones. Within the fill of Feature 47, a bell shaped pit adjacent to the central hearth, four calcined indeterminate mammal bones were recovered. A near complete kangaroo rat (*Dipodomys ordi*) skeleton was also found in Feature 47, but was thought to represent a post abandonment burrow death.

Interpretation of Activity Areas in Pitstructure 1, Component 1

Based on the arrangement of features and artifact concentrations there appeared to be 6 activity areas within the pitstructure: Activity Area 1, Sleeping area; Activity Area 2, Cooking and Storage area; Activity Area 3, Ritual-Ceremonial area; Activity Area 4, Food Preparation area; Activity Area 5, Work and Storage area; Activity Area 6, Stoage or Ritual area (Figure 8.25).

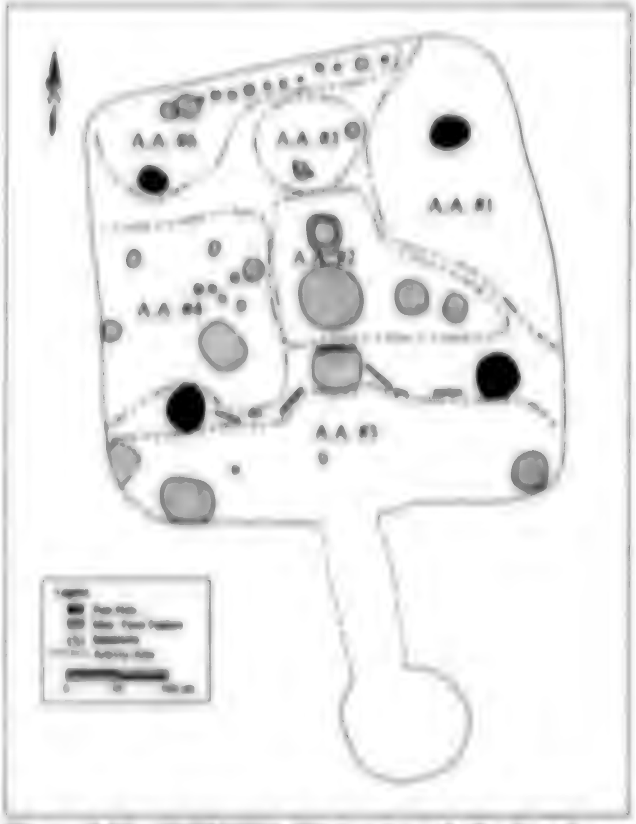


Figure 8.25. SMT10594, Pitstructure 1, Surface 1 activity areas.

Activity Area 1: Sleeping Area

Activity Area 1 encompassed the northeastern quadrant of the pitstructure floor north of the wingwall. Within this 5 m^2 area of floor space their was a "lack" of signs of activity which may mean that this part of the house was used as the sleeping area.

Activity Area 2: Cooking and Storage Area

This area encompassed the hearth, the bell shaped storage pit (Feature 47) immediately north of the hearth, a warming pit (Feature 74) and a pot rest (Feature 53). Besides the features, artifactual material in and around the hearth included nonhuman bone, flaked lithic tools, ceramics, and groundstone. The two nonhuman bones were the lateral malleolus from a bighorn sheep, and an indeterminate rib fragment from a mammal. The ceramics represented a Chapin Black-on-white bowl, and a gray ware bowl (probably from the same bowl), as well as 5 sherds from a plain grayware jar. There were also 4 utilized flakes, 1 non utilized flake, an asymmetrical biface, and a slab of thin tabular sandstone that had been ground and pecked on one flat surface. The hearth was an obvious source of heat,and light, as well as a place to prepare meals. The large bell shaped pit immediately north of the hearth would have been a handy place for short term storage of foodstuffs.

Activity Area 3: Ritual-Ceremonial Area

Activity Area 3 was a 1 m^2 area which encompasses the sipapus (Features 59 and 73).There were no artifacts found with in the area. Sipapus by definition are associated with ritual and ceremonial activities.

Activity Area 4: Food Preparation Area

Activity Area 4 was west of the hearth surrounding the large trough metate. Associated with this metate were four small pits (Features 65, 66,69, and 70), the two pot rests (Features 67 and 68), and a storage pit (Feature 57). Artifactual material within this area included 5 plain grayware jar sherds, 1 Abajo Red-on-orange bowl sherd, 1 utilized flake, and the trough metate. The pot rests and the small pits as well as the presence of a bowl and jar could all indicate activities associated with mealing activities or general all around food preparation activities. The entire western third of the pit house, north of the wingwall could be included in this activity area since it is this portion of the house which contains the majority of the pot rests and storage pits.

Activity Area 5: Work and Storage Area

Activity Area 5 encompasses the area south of the wingwall. This area contained more artifactual material than any other area of the pitstructure. Scattered throughout this area were ceramics dominated by Chapin Gray jar sherds. There were also pieces of an Abajo Polychrome bowl, an Abajo Red-on-orange bowl, and a Chapin Black-on-white bowl. A flaked lithic core tool and an asymmetrical biface, as well as 9 utilized flakes were also in the assemblage. Finally there were 4 jackrabbit bones, an unshaped 1-hand mano and a ground and polished stone of unknown function.

Activity Area 6: Storage or Ritual Area

Activity Area 6 was a narrow strip of floor along the north wall. This strip was bounded on the west and north by the two northern main support posts. This activity area is comprised and defined almost entirely by the 11 small sand filled pits located along the north wall. If all or most of these small pits were used as pot rests then this would be designated a storage area. They are near a storage pit (Feature 46). However, if they were not used as pot rests they would fall into the more traditional definition of cylindrical sand filled pits (for prayer sticks) which would indicate their possible use in ritual associated with the sipapu ritual area.

Summary of Activity Areas in Pitstructure 1

The activity areas defined across the floor of Pitstructure 1 were defined based upon the presence of features and artifact concentrations. The artifactual material across the floor represented discarded unwanted items and by no means reflected total assemblages associated with the activities assigned to each area. They may however, represent a pale reminder of those activities.

The hearth area contained food scraps, serving containers, and utilitarian vessels as well as utilized flakes, and a pecked and ground slab. None of these items are out of place in a domestic activity area where food is prepared and served.

The two sipapus and possibly the 11 sand filled pits occupied the extreme north end of the house and indicated that ritual as well as domestic activities occurred in this area of the pithouse.

The western third of the structure with its storage pits, pot rests and small cylindrical pits, as well as the trough metate, seemed to have been the area where most of the domestic activities took place.

Domestic activities also seem to have occurred south of the wingwall, based on the artifactual assemblage and the presence of a storage pit in each of the corners. The amount of utilized flakes as well as the groundstone suggested that food processing was the main activity which took place behind the wingwall. Pitstructure 1 appeared to have served its inhabitants in both a domestic and ritual capacity.

Pitstructure 2, 5MT10594, Component 1

East/west width : 3.4 m

Depth: 1.7 m

Pitstructure 2 was close to the western edge of Pitstructure 1. There were no surface indications to suggest the presence of a second pitstructure at this site. As the excavations were drawing to a close an exploratory trench was dug and auger testing was conducted west of the roomblock and west of Pitstructure 1. The trenches west of the roomblock were implemented to determine if any additional rooms were present in this area, none were. The auger tests were placed across a broad area west of Pitstructure 1 since cultural material was present in this area. In the area directly west of Pitstructure 1, five of the auger holes encountered minute bits of charcoal well below modern ground surface. Also in these five auger holes, the lens of Pleistocene gravel that was encountered at 75 cm in all other auger tests was missing. With this evidence in hand the presence of a second pitstructure was suspected. A test trench 60 cm wide was cut across the area of the anomaly using a CASE backhoe that was on site to be used in the backfilling operations.

The results of this trench revealed a pithouse that was 3.4 m wide east to west with a floor surface encountered 1.7 m below the modern ground surface (Figure 8.26). Both the walls and floor were extremely difficult to define due to upper wall collapse and the fact that this structure was apparently abandoned before its completion. The upper walls were defined by the location of the truncated face of the Pleistocene gravels, and the floor by its compaction which was greater than the fill both above and below.

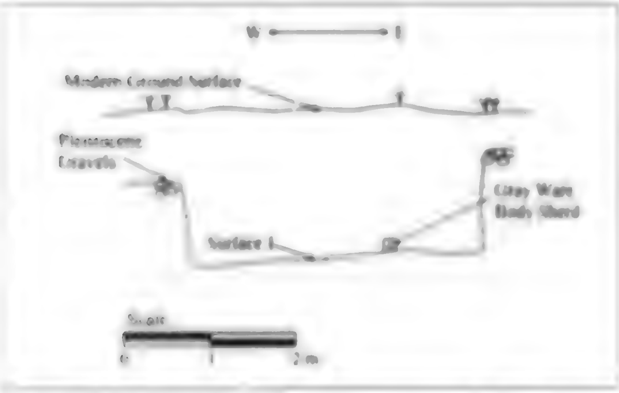


Figure 8.26. Profile view of Pitstructure 2, Site 5MT10594.

Stratigraphy of Pitstructure 2

The fill in the structure was identical to the native soils on which the site was built, except for the presence of charcoal bits in a homogenous pattern throughout and the presence of a single plain grayware body sherd near the level of the floor surface. The upper wall limits were not determined due to upper wall collapse.

Floor Features of Pitstructure 2

There were no floor features found in the 60 cm wide trench that was cleared across the short axis of Pitstructure 2. This total lack of features plus the stratigraphic profile led to the conclusion that the structure was never completed and the project was abandoned at the time that the rest of the site was abandoned. To test this hypotheses, a grid consisting of 60 cm parallel lines was superimposed over the plan map of Pitstructure 1 to determine if it was possible to find a strip that did not contain a feature or part of a feature. Only one 60 cm wide strip at the north end of the pitstructure did not have any features. All other strips contained all or parts of features. Since the test trench across Pitstructure 2 was near the center of that structure, it was highly probable that the test trench would have encountered one or more features, if they existed. The floor itself was another indicator that the house was never used. The floor surface was not smudged or stained by ash and there were no artifacts on the floor. Thus it is suggested that the construction of Pitstructure 2 was not completed and the structure was never used.

Midden Area at Site 5MT10594

The midden area was located uphill and directly south of Pitstructure 1. The exact limits were not defined during excavations. Two 1-x-2 m test pits were excavated in the midden area by the MWAC crew. The material recovered resembled the general site assemblage. It appeared that after site abandonment this midden deposit was slowly transported by water action downhill to the north and much of it was redeposited into the pitstructure.

Architectural and Feature Descriptions of Component 2 at Site 5MT10594, Pueblo II Occupation

Four features were found in Stratum II of Pitstructure 1 during the 1992 excavations (Figure 8.20). They represented a second component, a Pueblo II occupation, of the Site 5MT10594. Three hearths and a pile of oxidized stone were found in Stratum 2 of the fill in Pitstructure 1. Two hearths, Features 3 and 5, were vertically separated by 150 cm and spatially by approximately 2 m. The hearth and oxidized stone, Features 4 and 6, were vertically separated by 5 cm and spatially by approximately 2 m.

Feature 3: Hearth

Length: 50 cm

Width : 40 cm

Depth : Variable

The hearth, Feature 3, was located near the center of the Pitstructure 1 depression, 39 cm below modern ground surface. It was basin shaped in profile with a 1-3 cm oxidation rind. The fill in the hearth consisted of charcoal, burned adobe, and burned fragments of sandstone in a clayey silt matrix. A radiocarbon sample from this feature dated 1030+/-60 B.P. (Beta 75285) (ca. A.D. 860-980).

Pollen samples from the areas in and around the hearth suggested that both *Cleome* (beeweed) and *Zea mays* (corn) were processed near the hearth, and that corn was processed in the hearth. Macrobotanical samples of burned specimens of *Chenopodium* and *Amaranthus* (Cheno-am) were recovered from the floatation sample indicating that seeds of these species were being processed in the hearth.

Both rodent and mammal bone fragments were recovered from the Feature 3 hearth. Their were 3 rodent bones (1burned), 19 mammal bone fragments (6 burned), and 15 fragments of animal bone, 2 of which were burned.

Feature 4 - Burned Rock Midden

Length : 1 m

Width : 80 cm

Depth : 10 cm

The burned rock midden, Feature 4, was found 20 cm below the level of Feature 3, also near the center of the pithouse depression. The fill consisted of both burned and unburned cobble to boulder sized angular to subangular sandstone and charcoal. The boundaries of this feature were defined by the extent of the sandstone.

All of the macrobotanical remains collected were burned. There were 2 *Amaranthus* seeds, 1 *Chenopodium* seed, and 1 seed which could only be identified as a Cheno-am.

Nine unidentifiable mammal bone fragments were recovered. There were 2 rodent bones (1 burned), and 7 fragments of an unidentifiable taxa (1 burned).

Feature 5 - Hearth

Length : 25 cm

Width : 25 cm

Depth : 4 cm

Feature 5, a hearth, was found approximately 1 m east and south of Feature 4 at about the same depth. The hearth was a shallow basin dug into pithouse fill with no further modification or building materials. The fill consisted of charcoal and other burned construction material including wood, stone, and adobe in a gray brown sandy loam matrix. The boundaries of the feature were slightly blurred with some disturbance to the oxidation rind of the hearth. A radiocarbon sample from this hearth dated 1080 +/-50 B.P. (Beta 75286) (ca. A.D. 820-920).

Pollen samples indicated that beeweed was present. There was a high quantity of corn pollen in the this Feature 5 hearth. No seeds were recovered in the macrobotanical samples. There were 20 unidentifiable mammal bone fragments from this feature, nine of which were burned.

Feature 6 - Hearth

Length : 20 cm

Width : 20 cm

Depth : 1 to 2 cm

The third hearth of the Pueblo II component at 5MT10594 was Feature 6, found 14 cm below Feature 5. It was not clear if a very shallow basin had been dug for the hearth or if there had been no modification of the prehistoric existing surface. But the boundaries of the feature were abrupt and even. The fill consisted of many large fragments of burned wood and roof fall. Pollen samples from this feature were taken but have not yet been analyzed. Macrobotanical remains from this hearth were either unburned or burned beyond identification. There were 20 unidentifiable mammal bone fragments (7 burned), and 15 fragments of unidentifiable taxa (2 burned).

Material Culture, Flora, and Fauna Associated with Component 2, the Pueblo II Component at Site 5MT10594

A small sample of temporally diagnostic ceramics was associated with the four features of the early Pueblo II component. The identifiable types among these were Cortez Black-on-white and Mancos Corrugated. The date ranges for these pottery types are A.D. 875 to 1000 for Cortez Black-on-white, and A.D. 900 to 1150 for Mancos Corrugated. The overlap in ceramic dates indicated that the features were in use sometime between A.D. 900 to 1000. With the corroborating radiocarbon dates of between A.D. 820 and 980, the hearths, Features 3 and 5, were probably used at a point in time between A.D. 900 and 980.

Features 3 and 5, the hearths, contained high amounts of pollen from *Cleome* (beeweed), and corn as well as macrobotanical remains of Cheno-ams (*Chenopodium* and *Amaranthus*) seeds. This suggests that these foods were processed in the features. The burned rodent and mammal bone fragments from these features probably represent food scraps.

The data extracted from Features 4 and 6, the burned rock midden and hearth, were less conclusive. There were no radiocarbon dates for either of these two features. Stratigraphically they were later than Features 3 and 5. Feature 4 was the concentration of burned and unburned sandstone, which had macrobotanical remains of burned seeds of Cheno-am, *Chenopodium*, and *Amaranthus*. Unfortunately the plant remains in the hearth, Feature 6, were carbonized beyond recognition.

Interpretation and Conclusions on Site 5MT10594

Site 5MT10594 had two prehistoric components, one represented a major habitation site for people of Basketmaker III/Pueblo I times (ca. A.D. 700-750). The other component was a seasonal locus or use area type of campsite where food was processed by people of Pueblo II times (ca. A.D. 875-980). The entire Basketmaker III/Pueblo I component of the site was represented by a single architectural suite consisting of 3 domestic rooms, 2 pithouses (only one of which was ever in use), a courtyard area, 3 long term storage rooms, and a midden. The Pueblo II occupation was represented by 4 features in the filled Pitstructure 1 depression where corn and wild plant and animal foods were processed in a seasonal locus campsite.

Site Location and Layout

At the foot of the Mesa Verde cuesta where Site 5MT10594 was located, the ground slopes to the north at an average of four degrees. Even with this geographical feature working against them, the Basketmaker III-Pueblo I residents of the site insisted on laying out their site architecture in the traditional orientation. Therefore, the midden was uphill to the south, the pitstructure was downslope and north of the midden, the courtyard and room block were downslope and north of the pithouse. This may not have been a problem while the site was occupied in the early A.D. 700's but, a thousand years later it did explain why numerous artifacts were still present in the uppermost post abandonment layers. As the pitstructure depression was being filled by natural processes, much of the upslope midden deposit was also being deposited in the fill. After the pitstructure was totally filled and a relatively level surface resulted, the midden deposits remaining passed over the pitstructure and were deposited in the courtyard area.

Site Chronology at 5MT10594

The date range for 5MT10594 was based on radiocarbon dating and ceramic typological cross dating. The initial and primary occupation at the site was relatively short lived. The ceramic assemblage was neither complex nor did it crosscut numerous temporally sensitive types. The secondary usage of the site, during the Pueblo II period, was a brief episode and entailed using the mostly filled pithouse depression as a camping spot.

Radiocarbon Dating at 5MT10594

The radiocarbon samples for the primary occupation were recovered from the burned roof fall material overlying Room 1 and from the hearth fills in Rooms 1 and 2 (Table 8.22).

Table 8.22. Radiocarbon Dates from Rooms 1 and 2, Site 5MT10594

Provenience	BETA #	Radiocarbon Date	AD Date
Room 1, Roof fall	75282	1240 +- 60	710 (650-770)
Room 1, Feat. 1	75284	1240 +- 70	710 (640-780)
Room 2, Feat 12	75287	1580 +- 60	370 (310-430)

Two of the samples were fuel wood and one was from construction timber. Both dates from Room 1 compare favorably with the architectural style as well as the ceramic assemblage from the site. The AD 370 date from the hearth in Room 2 appears to be from a much older piece of fuel wood.

The Pueblo II episode was dated by samples from two of the hearths constructed in the fill of Pitstructure 1 and by one sample collected from the upper fill of Room 1 (Table 8.23)

Table 8.23 Radiocarbon Dates from Component 2 Features and Upper Fill of Room 1, 5MT10594

Provenience	BETA #	Radiocarbon Date	AD date
Feat. 3, Hearth	75285	1030 +- 60	920 (860-980)
Feat. 5, Hearth	75286	1080 +- 50	870 (820-920)
Room 1, Upper fill	75283	920 +- 60	1030 (970-1090)

These dates suggest that the Pueblo II episode took place in the time near the close of the ninth century and the first half of the tenth century. The sample recovered from the uppermost fill of Room 1 suggests that the site was utilized yet a third time during the middle Pueblo II period but no features were associated with this third usage.

Ceramic Dating at 5MT10594

The total ceramic assemblage from 5MT10594, including the Pueblo II material, was 5601 sherds (Table 8.24). The greatest percentage (58.3%) of ceramic assemblage material was plain grayware. Only 32 of the ceramic artifacts were associated with the Pueblo II period of occupation.

A total of 539 or 9% of the total assemblage could be assigned to a formal type category. The chronology of the site was based on these 539 sherds since they were temporally diagnostic. The greatest number of typeable sherds were Chapin Gray (314). This ceramic type dates from AD 630-930 (Blinman 1984). Following Chapin Gray in abundance was Chapin Black-on-white (97) which was made from AD 635-790. A red ware, Abajo Red-on-orange, was next in abundance at 88 sherds, and it was manufactured from AD 700-800. In association to the Abajo Red-on-orange, there were 6 sherds of Abajo Polychrome, which dates from AD 700-850. The total lack of Moccasin Gray neck banded pottery indicates that the Basketmaker III/Pueblo I occupation ended before AD 775. Two additional red ware types were present. There were 4 sherds of Bluff Black-on-red and 2 sherds of Dolores Red . The earliest dates given for Bluff Black-on-red are A.D. 750 and for Dolores Red, A.D. 765. Since these two pottery types are represented by 6 sherds of a total typeable population of 539 sherds it would indicate that they probably were acquired near the time of site abandonment. As a type, Dolores Red was defined during the Dolores Archaeological Program (Blinman 1984), and the beginning date of AD 765 was based on data retrieved from the Dolores River Valley sites. It is possible that this ceramic type was made and traded at the same time as Abajo Red-on-orange and Abajo Polychrome since they all derive from southeastern Utah. Therefore a terminal date for the Basketmaker III/Pueblo I occupation at 5MT10594 of around A.D. 750 seems reasonable, with a beginning date in the neighborhood of A.D. 700.

The Pueblo II episode was associated with the formal types Cortez Black-on-white (4), Mancos Black-on-white (1), Mancos Corrugated (2), and Mummy Lake Gray (1). These pottery types were made and used between AD 875 and 1200. The presence of these pottery types combined with the data from the radiocarbon samples suggests that the first Pueblo II episode probably took place in the first quarter of the tenth century (A.D. 820-960) and the second episode of reuse occurred during the first half of the eleventh century (A.D. 1030).

Table 8.24. 5MT10594 Ceramic Types and Forms

	Jar	Bowl	Seed Jar	Jar Handle	Pitcher	Other	Indeterminate	%
Plain Gray Body (3264)	2705	18		7		1 pinch	533	58.3
Chapin Gray (314)	285	17	8	1	3			5.6
Corrugated Body(16)	16							.3
Mancos Corrugated	2							.04
Mummy Lake Gray	1							.02
MesaVerde Corrugated	1							.02
Painted White (98)	15	79	2			1 bowl dipper	1	1.7
Polished White(1590)	530	860	2	1			197	28.4
Slipped White (3)	1	2						.05
Sherd White (4)	2	1				1 gourd dipper handle		.07
Chapin B/W (97)	3	94						1.7
Piedra B/W (19)		19						.3
Cortez B/W (4)	1	3						.07
Mancos B/W (1)	1							.02
Early Pueblo Red (76)	4	60					12	1.4
Abajo R/O (88)	2	86						1.6
Bluff B/R (4)		2				1 feather box	1	.07
Abajo Polychrome (6)		6						.1
Dolores Red (2)	1	1						.04
Indeterminate (11)							11	.2
N = 5601	3570	1248	12	9	3	4	755	
%	63.7	22.3	.2	.2	.05	.07	13.5	

Economy and Adaptation at Site 5MT10594, Basketmaker III/Pueblo I Component

The data from 5MT10594 suggest an economy and adaptation characterized by utilization of a wide variety of resources. Local clays, local lithic resources, native plant resources, and native animal resources were predominant in the site remains. Evidence of some trade was indicated by the presence of redware ceramics from southeast Utah. Two lithic material types, chalcedony from north central New Mexico and high grade chert from the McElmo Canyon-Cannonball Mesa area indicated possible limited trade.

Ceramics

With the exception of the redwares, the majority of the pottery at the site consisted of locally made gray and whitewares. The locally available clay, temper, and paint sources were actively sought out and utilized. The variety of vessel forms present indicated activities associated with the economy of a habitation site. The assemblage consisted primarily of jars and bowls with three pitchers and a dipper. The Bluff Black-on-red feather box may indicate ritual activities associated with the Basketmaker III/Pueblo I habitation.

Lithics from Site 5MT10594

The lithic assemblage recovered from 5MT10594 had few high energy, high input tools such as projectile points.. There were many low input, expedient type tools such as utilized flakes (Tables 8.25, 8.26, and 8.27). The majority of all of the tools were made from locally available materials with less than 1% (chalcedony and high grade chert) representing exotics from farther than 20 km distance. The tool types themselves such as manos, metates, hammerstones, asymmetrical bifaces, and utilized flakes strongly suggest an economy based on horticulture as opposed to hunting and gathering. The production technology represented by the flaked lithic assemblage is best interpreted as expedient and in this respect is similar to other Anasazi assemblages

aunal Remains from Site 5MT10594

The faunal assemblage from this site consisted of 518 pieces of animal (nonhuman) bone (Table8.28). Most of this bone was too fragmentary to be identified beyond the order level. There appeared to be no *Aves* (bird) present at all. Most of the rest of the bone material was from small to medium sized mammals. A single bone from a bighorn sheep (*Ovis canadensis*) represented the only large mammal. The five identifiable species were kangaroo rat (*Dipodomys*), ground squirrel (*Spermopheles sp.*), cottontail rabbit (*Sylvilagus sp.*), jack rabbit (*Lepus sp.*), and bighorn sheep.

With the exception of the bighorn sheep this assemblage suggested that garden hunting was prime avenue through which meat was secured, and also suggested that these people had yet to domesticate the wild turkey. The presence of the kangaroo rat is of interest since the species inhabits more xeric environments and subsists primarily on seeds.

Macrobotanical and Palynological Remains from Site 5MT10594

The macrobotanical remains as well as the palynological samples suggested a drier environment at the time of occupation with a floral cover dominated by grasses and brushy vegetation with only scattered pinyon/juniper. The samples were replete with wild and ruderal plant remains with corn being the only cultivated plant of record. The corn pollen was most heavily represented in Rooms 4,5, and 7 which were all storage rooms. The wild or ruderal remains were difficult to specifically interpret since contamination through aboriginal or modern sources cannot always be controlled. Most of the ruderal pollen within the site was *Chenopodium* and *Amaranthus* (Cheno-am) (goosefoot and pigweed) and *Poaceae* (grass) all of which had a wide usage ethnographically. The high concentrations of *Pinus* pollen compared with shrubs and grasses present in the surface control sample were reversed in those samples taken from undisturbed floor and feature proveniences. The prehistoric landscape was far more open prehistorically than at the present time and was dominated by shrubs and grasses. Whether this more open landscape was the result of human activity, clearing the land in the pursuit of horticulture, or a result of a period of drought is unclear.

It is probable that the high percentage of Cheno-am, and *Poaceae* in the storage Room 7 represented cultural activities as opposed to natural pollen rain.

Table 8.25. 5MT10594 Flaked Lithic Tool Forms and Material Types

	Assymetrical Biface	Chopper	Core	Hammer-stone	Utilized Flake	Other	%
Basalt (15)	1	1	11	2			5.5
Chalcedony (3)					3		3.1
Chert (26)	2	2	3		17	1 graver, 1 symmetrical biface	27.0
Claystone (1)					1		1.0
Granite (2)				1		1 axe	2.1
Quartzite (26)	1	2	4	2	16	1 uniface	26.8
Sandstone (3)			1		1	1 abrader	3.1
Siltstone (21)	5		1		14	1 uniface	21.6
N = 97	9	5	20	5	52	6	
%	9.3	5.2	20.6	5.2	53.6	6.1	

Table 8.26. 5MT10594 Nonflaked Lithic Tool Forms and Material Types

	Hammerstone	Mano	Metate	Other	%
Basalt (1)	1				2.3
Diorite (2)		1, *1-hand*	1		4.5
Granite (1)		1, *1-hand*			2.3
Limestone (4)		2, *2-hand*	2 *trough*		9.1
Quartzite (3)		1, *2-hand* 2, *1-hand*			6.8
Sandstone (32)	1	7 *(2, 1-hand;* *3, 2-hand)*	1[illegible] *4 trough)*	9 *(2 ground/polished stone;* *5 slabs, 2 indeterminate)*	72.7
Siltstone (1)	1				2.3
N= 44	3	14	18	9	
%	6.8	31.8	41.0	20.5	

Table 8.27. 5MT10594 Flaked Lithic Debitage Forms and Material Types

	Primary	Secondary	Tertiary	Shatter	%
Basalt (202)	41	120	36	5	29.1
Chalcedony (3)	1	1	1		.1
Chert (148)	11	80	54	3	21.4
Hornfels (6)		4	2		.9
Limestone (9)	3	6			1.3
Quartzite (278)	39	154	83	2	40.1
Sandstone (19)	8	9	2		2.7
Siltstone (28)	1	5	21	1	4.0
N= 693	104	379	199	11	
%	15.0	54.7	28.7	1.6	

Table 8.28. 5MT10594 Faunal Remains from 1993 Excavations

Location	Quantity	Description
Room 1, Surface 1		
PL 68	1	*Spermophilus sp.* L. ulna
Room 3, Stratum 2		
PD # 816.42	1	*Lepus sp.* distal metapodial
Pitstructure 1, Surface 1		
PL 49	1	*Sylvilagus sp.* 1st phalange
PL 60	2	Indeterminate mammal
PL 58	1 2	Indeterminate medium mammal rib fragment Indeterminate medium mammal long bone frags
PL 45	1	Indeterminate medium mammal rib fragment
PL 40	1	*Ovis canadensis* L. lateral malleolus
PL 23	1 1 1	*Lepus sp.* premaxilla *Lepus sp.* metapodial *Lepus sp.* rib fragment
PL 20	1	*Lepus sp.* rib fragment
Pitstructure 1, Stratum 3		
PD # 814.6	1	*Sylvilagus sp.* metapodial fragment
PD # 814.10	2 1	*Lepus sp.* metatarsal Indeterminate large mammal long bone diaphysis frag
Pitstructure 1, Feature 47		
PD # 828.2A	 4	*Dipodomys ordi* near complete skeleton Indeterminate mammal (calcined)
Courtyard 1, Segment 2, Stratum 1		
PD # 809.3	2	Indeterminate medium mammal long bone diaphysis
Total	**24***	

*This total does not include the partial kangaroo rat skeleton recovered from 828.2A.

Cheno-ams are a group of plants that include the goosefoot family (*Chenopodiaceae*) and pigweed (*Amaranthus*) and ethnographically were exploited for both their greens and seeds. Members of the *Poaceae* (grass family) are noted ethnographically to have been exploited for their seeds, which were ground and used for a variety of mushes, cakes and breads. *Sporobolus* (dropseed), and *Oryzopsis* (Indian rice grass) appear to have been the most widely used (Colton 1974:338,365; Cushing 1920:219,253; Whiting 1939:65). The corn pollen represented one of the three staple cultigens raised by the Anasazi. Other Cheno-am and beeweed seeds were charred and found in hearth contexts making it likely that these plants were being actively sought, harvested, and eaten.

Drought conditions existed before and during the Basketmaker III/Pueblo I occupation of Site 5MT10594 (major droughts A.D. 560-570, A.D. 610-620 and lesser droughts A.D. 706-712 and A.D. 738-745) according to tree-ring records at Mesa Verde National Park. The environment between AD 550-750 was subject to 55 years of drought which would have been enough to create the landscape along the bottom of the north escarpment that was recorded in the pollen record. The prehistoric inhabitants in the Montezuma Valley area, during the Basketmaker III period, were living in a drier environment with a more open aspect than what is present today and cheno-ams and grass seeds would have been more easily available that is presently evident.

The species of trees used in the site's construction also reflect the more xeric aspect of the immediate site environment. Of the 79 tree-ring samples submitted for analysis 59 were Douglass fir (*Pseudotsuga*), nine were ponderosa pine (*Pinus ponderosa*), nine were pinyon pine (*Pinus edulis*), and two were juniper (*Juniperus*). The nearest source for Douglass fir today is those stands near the north rim on a north facing slope at an elevation of 2427 m. The effort required to climb 354 m almost vertically up the North Rim to secure acceptable construction timbers could indicate that other species were not readily at hand.

Without an adequate supply of water to the Mancos Shale soils of the Montezuma Valley no horticulturalist could provide enough corn, beans, or squash to feed a family. It is possible that, in those poor times, a horticultural group would be forced back into the economy of foraging and derive a great deal of sustenance from wild plants to fill in the gaps left by poor harvest of domesticates. The abundance, in the pollen record, of seed producing wild flora versus that of domesticates may point toward the adoption of this type of economic and adaptive strategy.

Site Formation Processes at 5MT10594

A building sequence for the Basketmaker III/Pueblo I component and use of the structures was suggested by the stratigraphy and site architecture. Site use and abandonment processes were also suggested in the stratigraphic deposits at Site 5MT10594.

Room 2, on the easternmost end of the room block, and Pitstructure 1 were the first architectural structures to be built at 5MT10594. Spatially Room 2 did not appear to have shared a common wall with any other surface room. The four main support post pattern in Room 2 seemed better designed to support a superstructure specific to the one room rather than shared with another contiguous room. The wing wall pattern in Room 2 was also different from Rooms 1 and 3. In Room 2 the wingwall extended from the room corners directly to the edges of the hearth. In Rooms 1 and 3 the wingwall formed a straight line from west to east, leaving the hearth isolated to the north. The fill in the post holes of Room 2 also indicated that it was of the earliest construction. All of the four main support sockets were filled with alluvial wash interspersed with small bits of charcoal. This post abandonment fill indicated that the room was abandoned and the building material salvaged for reuse. That the site was still occupied after this event was demonstrated by the artifactual material found in the fill of this room suggesting that trash was sometimes discarded in the area.

The next building sequence entailed the construction of Rooms 1 and 3 and probably their associated storage Rooms 4, 5, and 7. This new series of construction suggested that either another family arrived or the nuclear family which had occupied Room 2 had grown, necessitating larger quarters. Rooms 1 and 3 apparently shared a common wall. Room 1 contained 9.55 m^2 of floor space while Room 3 contained 12.08 m^2 of floor space. This size difference could indicate that Room 3 was occupied by the original dwelling group when Room 2 was abandoned, and Room 1 was occupied by the excess individuals. The new people could have been result of normal family increase, marriage, or immigration. The total population at the site probably never exceeded 8 to 10 individuals, and Pitstructure 1 contained enough floor space (20.59 m^2) for all the residents of the site.

Pitstructure 1 was originally excavated through a lens of Pleistocene gravel to a depth of 2.12 m. There is evidence of remodeling of the hearth during the occupation and alteration of the wing wall during the Basketmaker III/Pueblo I occupation. Based on ethnographic literature from around the world Cameron (1991) estimates that structures of this type have a four to ten year use life (see also Glennie 1983 and Varien 1984). Over its 30 years of use, Pitstructure 1 at 5MT10594 was probably remodeled two or three times. Pitstructure 2 was never finished. Could it be that when the dwelling group of Room 1 left, for whatever reason, the remaining few people decided to build a new, smaller, pitstructure which would have been easier to maintain. Then, before Pitstructure 2 was completed, the few remaining inhabitants found it necessary to abandon the site altogether.

Room 1 appeared to be abandoned and open to the elements prior to the total abandonment of the Basketmaker III/Pueblo I abandonment of the entire site. This was indicated by the silty water lain deposit on the floor near the western wall. Some, if not all, of the superstructure would have had to have been removed from Room 1 for the silty soil to have washed into the structure. The silt deposits were particularly evident around the edges of the room. Shallow lenses of burned and unburned roof fall were found on top of the silt deposit. This material could have been derived from the collapse of Room 3 when it burned or could be from the burning of the superstructure of Room 1. However, the floor surface of Room 1 was not oxidized as it was in Room 3.

Room 2 was dismantled at some point prior to site abandonment. The fill within the four post sockets did not contain any remnants of rotted or burned posts. The post hole fill was distinguished based on the presence of some cultural material. Surface 1 in Room 2 was covered with thin alluvial layers directly on top of the surface suggesting that the room was dismantled before site abandonment and possibly before construction of Rooms 1 and 3. The floor surface was not oxidized. The artifact assemblage did not indicate any discrete activity areas and appeared to consist of unusable or unwanted items not removed at the time of abandonment.

Room 3 was burned while it still retained its superstructure but it appeared that the occupants selectively removed all the useable and desired household goods. The flat roof of Room 3 was probably supported by four vertical posts. Based on the vegetal sample analysis from the roof fall stratum, the roof was first covered by sagebrush and juniper bark and then covered with a layer of adobe. Room 3 was the only room at the site which burned. Burned material lying in and around Rooms 1 and 2 and in the pitstructure fill and courtyard area probably came from Room 3. The floor of Room 3 was the only one which was oxidized. The burned roof fall material decreases eastward in the layers above Room 1 and 2 suggesting that when Room 3 burned and collapsed, the major portion of the collapsing room fell to the east and the burned construction elements were broadcast across Rooms 1 and 2.

At the time of abandonment the roof and side walls of Pitstructure 1 were dismantled leaving quantities of adobe on the floor along with a few rotted poles and numerous tabular sandstone slabs. The slabs represented the hatchway lining slabs. At some time after abandonment, the north upper wall of the pitstructure collapsed.

Social Organization of Component 1, Basketmaker III/Pueblo I, at Site 5MT10594

Component 1 of Site 5MT10594 was a small Basketmaker III/Pueblo I hamlet which consisted of a single architectural suite (*sensu* Lightfoot 1994). The three surface rooms indicated an occupation by three separate individual family dwelling groups each with their own long term storage facility. Pitstructure 1 would have served as the domicile for the residents during the colder months of winter, and did not represent the home of a separate dwelling group.

The pitstructure and surface structures show complimentary habitation uses. The pitstructure contained ritual features and very little storage area while the surface rooms contained artifacts and features associated with economic activities and long term storage and minimal evidence of ritual features. The pitstructure had the ritual related features such as the sipapus, whereas the surface domestic rooms did not. Within the pitstructure, all five of the storage pits were small, and represented short term storage. The surface domiciles had even less short term storage within the living rooms, but they did have the three, jacal, storage rooms for long term storage.

From the analysis of site's architectural development it seems likely that the total population 5MT10594 during Basketmaker III/Pueblo I times was between 8-10 individuals. The family structure was probably a nuclear family household as the primary residential component of the lineage group (Brikedal 1976). Each domestic room probably housed a small dwelling group during the warm months and the pitstructure housed those groups during the winter. The three surface rooms were not occupied during the same time. Room 2 was probably abandoned or not in use when Room 3 and Room 1 were occupied by the two Anasazi families.

Evidence from limited survey of the surrounding area indicated a large Basketmaker III presence and a very minor Pueblo I presence. This low density of Pueblo I sites may be the result of unfavorable weather conditions which are indicated in tree-ring samples and pollen records. By A.D. 700, many of the Montezuma Valley inhabitants may have moved to higher elevations where dry land farming was not quite so precarious. There was a large influx of people not only on the top of Mesa Verde proper but also in the Dolores River Valley to the north in the period from A.D. 700-750. The remnant population in the Montezuma Valley may be best categorized as a dispersed community cluster. Social organization was probably centered around the nuclear family with little interaction on a day to day basis with neighboring families.

Summary of Site 5MT10594

Site 5MT10594 was a two component Anasazi site occupied during Basketmaker III/Pueblo I time period (ca. A.D. 700-750) and reoccupied again in the Pueblo II period. The Basketmaker III/Pueblo I component of the site consisted of a room block of three contiguous living rooms facing a courtyard area and pitstructure with a midden to the south. Three small storage rooms were connected to two of the living rooms along their north sides. The plan and construction of the living rooms was unique in that they had wingwalls and shallow ramp entryways. A second pitstructure at the site was never completed. The Pueblo II component was represented by three hearths and a burned rock midden built in the fill of Pitstructure 1.

Basketmaker III/Pueblo I Component at 5MT10594

Site 5MT10594 was a small farmstead first occupied by two nuclear families at a point in time between A.D. 700-750. This was a transitional time between the late Basketmaker III period and the early Pueblo I period. Architecturally the site plan resembles a Pueblo I hamlet more than a typical Basketmaker III site.

The three domestic rooms were highly unusual since they had a south facing ramp entry and wingwalls. As odd as it is to find wingwalls in Pueblo I surface room they might be a practical necessity to compensate for a large hole in the south walls where the equally unusual ramp entries were constructed. With the prevailing southwest winds of the area strong wind gusts entering the house from the south were more severe than they would be with only a roof entry. Therefore the wing walls would be necessary to disperse these gusts around the hearth much as they did in pithouses.

This small rural group of people was subsisting in an area much more xeric than the area is today and from time to time may have had to resort to harvesting wild seed crops to augment the domestic crops. Of the domesticated Anasazi plants only corn was found in the pollen record.

Pueblo II Component at 5MT10594

The ceramic, radiocarbon, faunal, and floral evidence from the four features found in the fill of Pitstructure 1 suggested the time period of use and the type of occupation represented in the Pueblo II component at 5MT10594. Additionally, the radiocarbon date of 920+/-60 (Beta 7528) (A.D. 970-1090) from the upper stratigraphic level of Room 1 provided evidence of a late Pueblo II occupation around A.D. 1030 but with no associated features. Ceramic typological cross dating and radiocarbon dating provided a date of between A.D. 875-980 for the occupation of the filled pitstructure depression. Floral and faunal remains suggested food processing of both domesticated and wild plants, and wild mammal bone.

For people of the early Pueblo II time period, the partially filled depression from Pitstructure 1 seemed to have formed a convenient site for a food processing campsite for domesticated corn, natural seed bearing flora, and wild mammals.

CHAPTER 9

MESA VERDE SEGMENT TESTING AND EXCAVATION: SITES 5MV3970, 5MV3987, 5MV3971, 5MV3978, 5MV3942, 5MV3962, 5MV3963, 5MV3964, 5MV3965, 5MV3966, 5MV3973

Joel M. Brisbin

This chapter deals with sites which were excavated or tested on Chapin Mesa as a result of Phase III of the Mesa Verde Waterline Replacement Project (Figure 9.1). Four prehistoric features were excavated due to inadvertent impact by construction activities: 5MV3970 (hearth), 5MV3971 (bell shaped pit), 5MV3987 (hearth), 5MV3978 (burial). Seven historic sites were investigated: 5MV3942 (historic check dam with prehistoric check dam component), 5MV3962 (Old Spruce Tree Maintenance Yard), 5MV3963 (Deep Water Well and Pump House), 5MV3964 (Chapin Mesa Catchment and Storage System), 5MV3965 (Spring Water Storage Tank), 5MV3966 (Feature 2-Historic Trash Pit), and 5MV3973 (Utility Trenches).

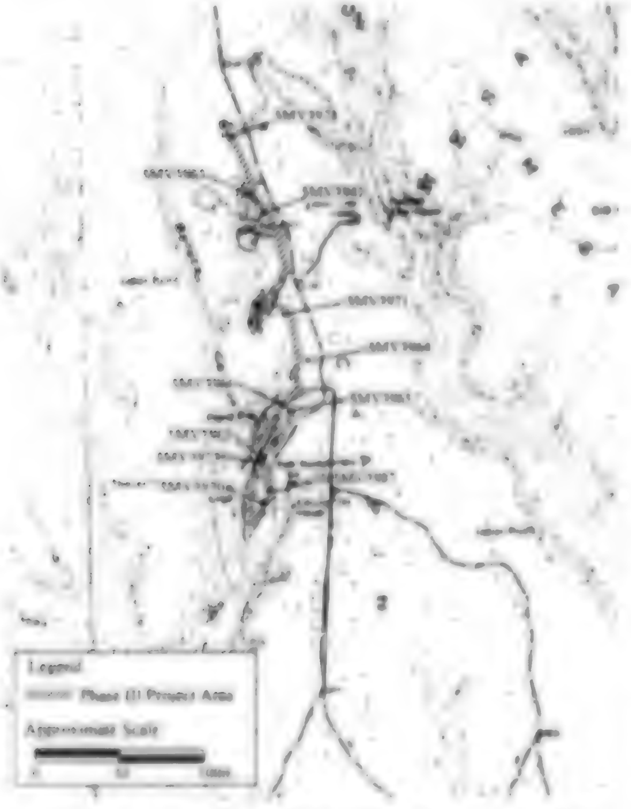


Figure 9.1. Location of sites tested and excavated on Chapin Mesa (Moccasin Mesa, CO, 7.5 minute quadrangle, 1975).

Site 5MV3970 (Hearth)

The hearth feature which defined site 5MV3970 was found beneath 1 m of construction fill and a layer of asphalt in the roadway next to the Mesa Verde National Park Museum entrance. Historically this canyon rim area has received considerable cutting and filling in order to make it reasonably level for Park visitors. The 1 m of fill above the feature was the result of filling a low spot in order to construct the Museum loop road. Nearly two thirds of the feature was removed by the entrencher which was excavating the waterline trench in this area (Figure 9.2). The dimensions of this hearth were 39 x 14 cm. The original construction may have been larger (45 x 35 cm). The feature was 9 cm deep but may have been as deep as 15 cm prehistorically.

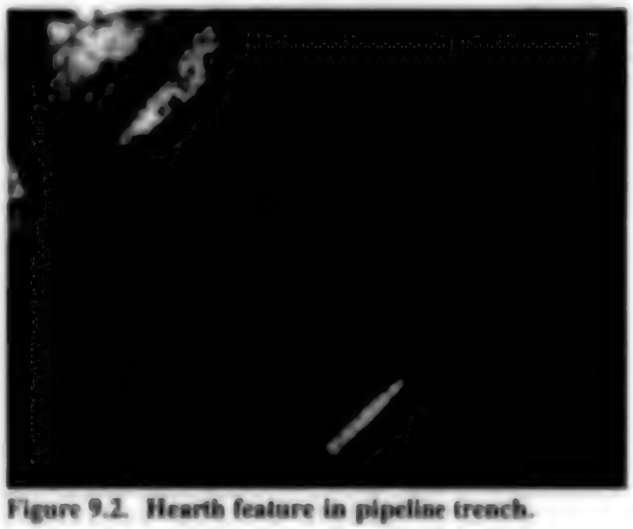


Figure 9.2. Hearth feature in pipeline trench.

The fill within the feature was a homogenous brownish grey silt loam interspersed throughout with charcoal flecks and small chunks. A single oxidized piece of tabular sandstone was lying in the fill near the north end of the feature. Neither the floor nor the sides of the feature was oxidized. The fill within this feature appeared to be secondary fill from the immediate area around the hearth. The feature was empty at the time of last usage and filled by post abandonment processes. There were no artifacts in association with this small hearth. This feature could be related to historic campers ca. 1889 to the 1920s or it could have been constructed at any time during the Anasazi occupation of the area.

Site 5MV3987 (Slab Lined Hearth)

The slab lined hearth at Site 5MV3987 was impacted during pipeline trenching. This feature was located beneath the sandstone curbing stones (installed ca.1930) which separate the Museum loop road from the asphalt walkway along the west side of the Museum. From the top of the curbing stones to the top of the feature was 60 cm. This feature was first encountered from the roadway side of the curbing and up until its actual excavation it was thought to be another kiln due to the morphological characteristics that were then visible. In order to carry out excavations, and not obstruct the roadway, a portion (2.8 x 1.35 m) of the walkway was removed. Once excavation determined that this was not a kiln but instead was a slab lined hearth it was decided to leave unexcavated the eastern portion beneath the historic sandstone curbing. In this way the original fabric of the historic curbing would not unnecessarily be disturbed. The extant portion of the feature measured 28 cm in width, 72 cm in length, and 25 cm in depth. The hearth feature was lined along the walls and bottom by highly oxidized pieces of tabular sandstone. The basin had been excavated into undisturbed colluvial deposits (Stratum 6). The feature appears to have been circular or oval in shape (Figure 9.3).

There were five stratigraphic levels overlying the feature at site 5MV3987. Strata 1 through 5 all represented historic construction activities related to leveling and road building. Within the feature there were two strata designated Stratum 1 and Stratum 1A. The lowermost (Stratum 1A) consisted of primary hearth fill. This was a carbonaceous soil with a large amount of charcoal inclusions and small fragments of oxidized sandstone. The fill was 4 cm thick in the center of the basin and ranged from 6 to 12 cm along the edges. Stratum 1, above Stratum 1A within the boundaries of the feature, was a diffuse sandy loam mixed with ash, charcoal bits and small fragments of both burned and unburned sandstone. Stratum 1 represented post abandonment fill and was probably derived from debris which accumulated around the feature during its use.

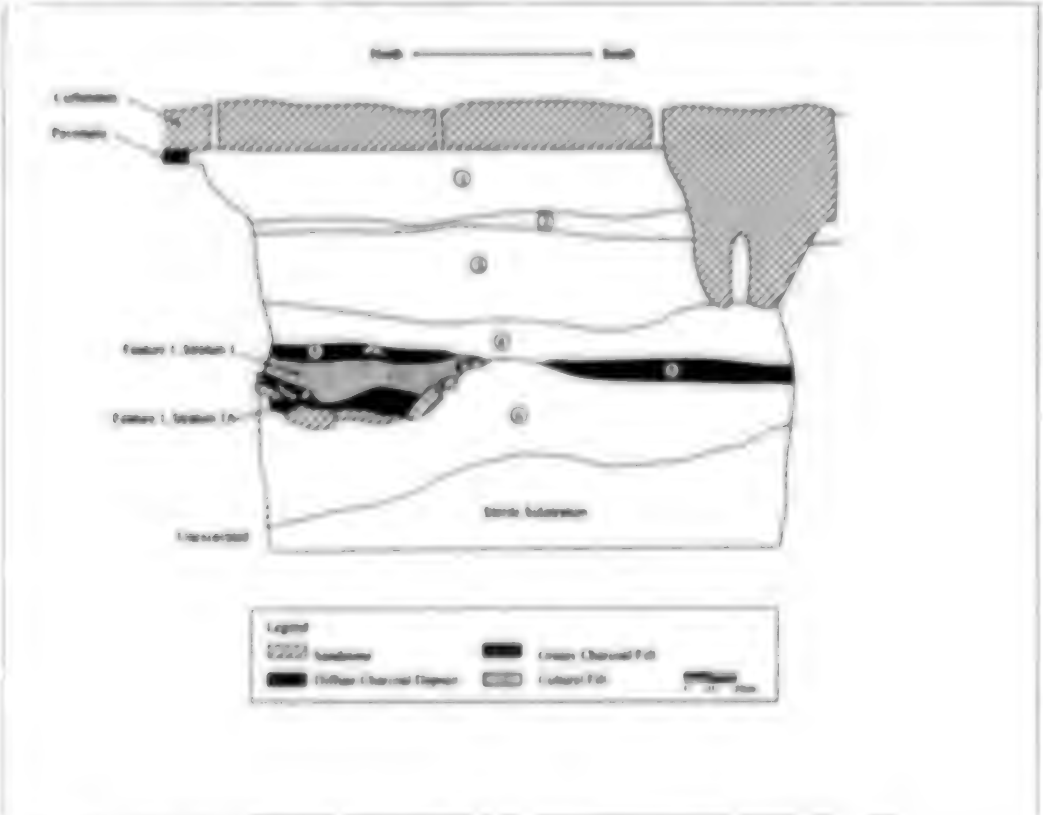


Figure 9.3. Profile view of slab lined hearth at Site 5MV3987.

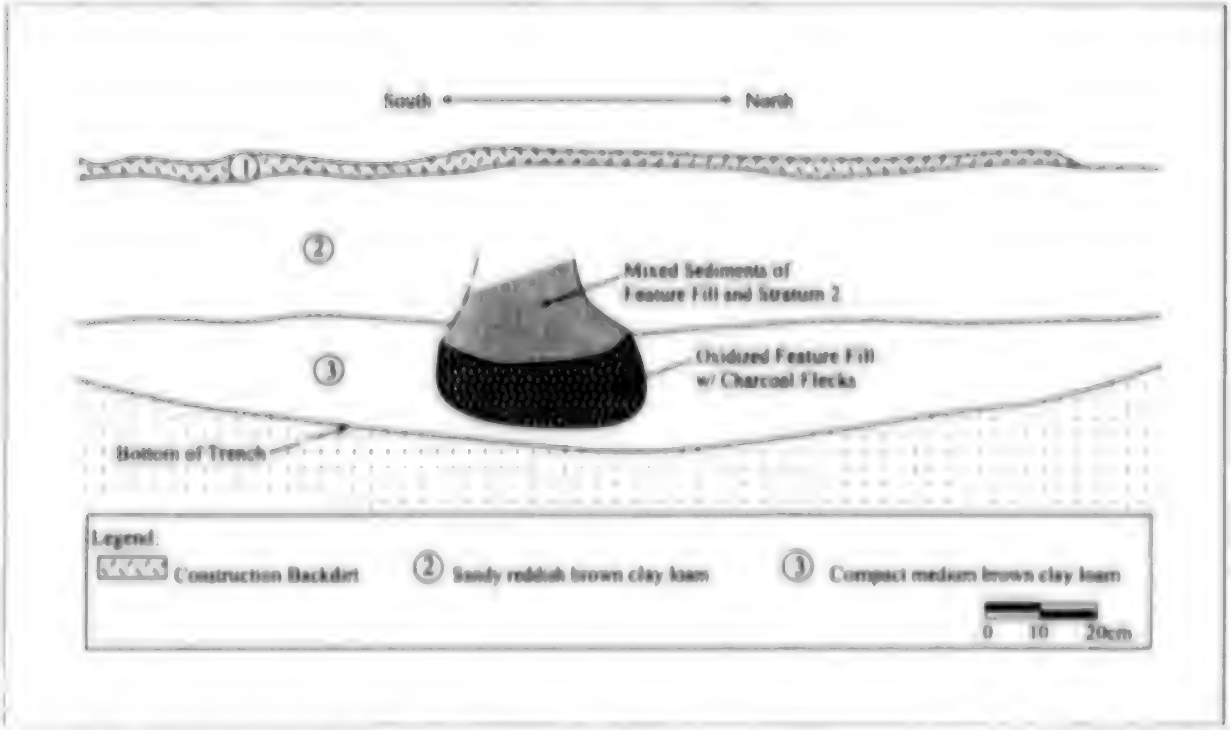

South
North
①
②
Mixed Sediments of Feature Fill and Stratum 2
③
Oxidized Feature Fill w/ Charcoal Flecks
Bottom of Trench
Legend:
Construction Backdirt
② Sandy reddish brown clay loam
③ Compact medium brown clay loam
0
10
20cm

Figure 9.4. Bell shaped pit at Site 5MV3971.

The feature at 5MV3987 had all of the characteristics of a prehistoric slab lined hearth. The lack of artifacts and its isolated occurrence away from any habitation sites provided no means of further interpretation.

Site 5MV3971 (Bell Shaped Pit)

This bell shaped pit feature at Site 5MV3971 was discovered near the maintenance division 1 km north of the two hearths just described and 100 m north of site 5MV3899 which contained two pottery firing kilns.

The feature at 5MV3971 was impacted by the large rock eating entrencher which removed over half of the feature before it was known that any feature was even present in this area. It appeared to be the remains of a small bell shaped pit approximately 30 cm deep by 42 cm wide at the bottom which had been prehistorically fired to harden its exterior surface (Figure 9.4). The feature was backfilled and markers put out to divert construction equipment around the area until excavations could begin. Before the excavation a rubber tired backhoe ran directly over the feature which virtually destroyed what was left of this small pit. There were no associated artifacts. With what other site this feature was associated is unknown since their are no known habitation sites in the immediate area. Generally these types of features are associated with habitation sites ranging in time from the late Archaic period through the Pueblo I period in this region.

Site 5MV3978 (Prehistoric Burial)

Construction activities associated with the Mesa Verde Waterline Replacement Project impacted a human burial at Site 5MV3978. Consultation under the provisions of the Native American Graves Protection and Repatriation Act (NAGPRA) resulted in an agreement which provided for excavation and rapid reburial of human remains and grave goods following limited non-destructive analysis (Chomko 1992). The interment without grave goods was an adult male placed in the flexed position in a shallow pit. The individual suffered from periodontal disease; dental carries; and degenerative osteoarthritis of the neck, thoracic and lumbar vertebrae and knees. The bones also showed characteristics of nutritional stress in the form of osteomalacia. The remains were repatriated as stipulated by the Memorandum of Understanding regarding Native American Human Remains and Associated Artifacts Encountered as a Result of Pipeline Construction within or Near Mesa Verde National Park (Contract CX 1200-9004). The human burial was almost certainly associated with an unrecorded Basketmaker III habitation site nearby.

Site 5MV3942 (Prehistoric and Historic Check Dams)

Site 5MV3942 consisted of both prehistoric and historic check dams and terracing (Figure 9.5). The site was located on Chapin Mesa in Township 34N, Range 15W in an unsectioned part of the Moccasin Mesa 7.5' Quad, 1967, elevation 2164 m (7100 ft). The site was significant within the historic context of Depression-Era Development at Mesa Verde National Park (Husband 1984).

The prehistoric component of this water control system was comprised of two small check dams placed diagonally across a southwest flowing erosional artery which pours into a side canyon of Spruce Canyon. The prehistoric check dams were constructed from unshaped sandstone blocks. The terracing was arranged in a linear fashion and stretched across the flow of the erosional channel.

The historic element of 5MV3942 consisted of two sandstone check dams and a culvert constructed during the Depression Era by the CCC. This check dam system was constructed in a linear manner similar to the prehistoric feature. There was also a possible

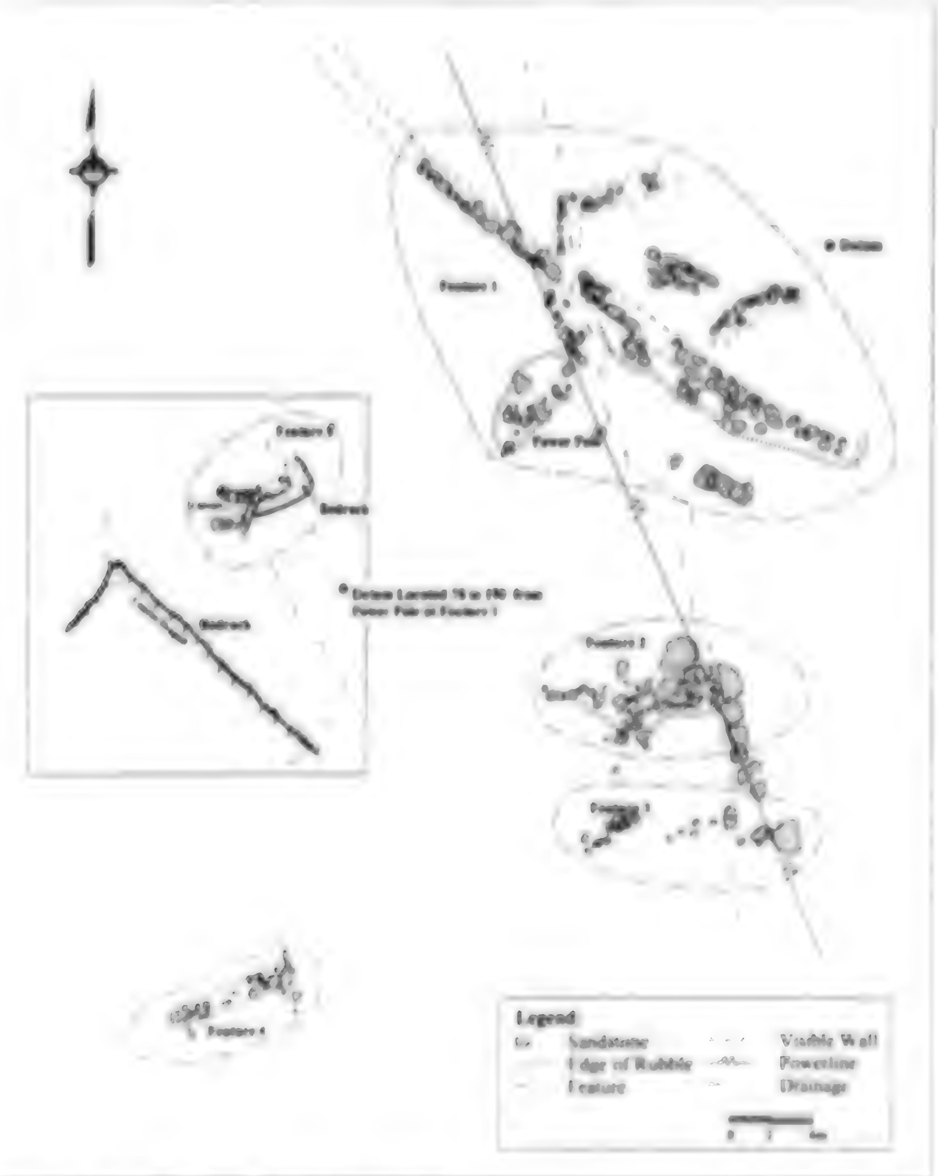


Figure 9.5. Plan view of Site 5MV3942.

extension wall leading to the present Research Center road. The CCC built four additional walls, two of which served to channel water, and two of unknown function. The last aspect of this historic component was an outlet drainage constructed as a galvanized culvert.

Methodology at Site 5MV3942

Prior to construction activities, Site 5MV3942 was surface surveyed, mapped, and recorded on a Colorado Cultural Resource Survey Management Data Form, an Historical Archeology Component Form, and a Prehistoric Archeological Component Form. The original route of the replacement pipeline was scheduled to pass through the site. Upon discovery of the check dams, the waterline was rerouted and the site was avoided.

Feature Descriptions at Site 5MV3942

Feature 1 of site 5MV3942 was an historic check dam constructed by the CCC in the 1930s. This check dam consisted of unmortared, unshaped sandstone blocks. The main wall was 18 m in length and was constructed diagonally across the drainage. There appeared to be an extension from the main wall which ran in a southwest direction toward the road to the Research Center. Four other walls were also apparent. Two of these were channel walls, 3 m in length. The function of the two remaining walls was indiscernible. They were 2 m and 2.5 m in length.

Feature 2 appeared to be a prehistoric check dam constructed on bedrock. It was constructed perpendicular to the drainage and was 6 m in length. This check dam was eroded through the center and contained a single wooden post or stump at its east end.

Feature 3 was also a prehistoric check dam of masonry construction. It was 8 m in length, with 4 m of the feature missing due to erosion. Three courses of sandstone were discernable on a 2 m section of the remaining wall.

It could not be determined if Feature 4 was constructed prehistorically or historically. The terrace wall was 6 m in length and was erected on the west side of the drainage west of Features 1, 2, and 3.

Feature 5 was an outlet for the drainage runoff into the side canyon to Spruce Canyon. It was constructed of a galvanized steel culvert and set into mortared sandstone masonry. The galvanized pipe was .5 m in length and 30 cm in width. The masonry wall was 3 m in length and 50 cm in width (Figure 9.6).

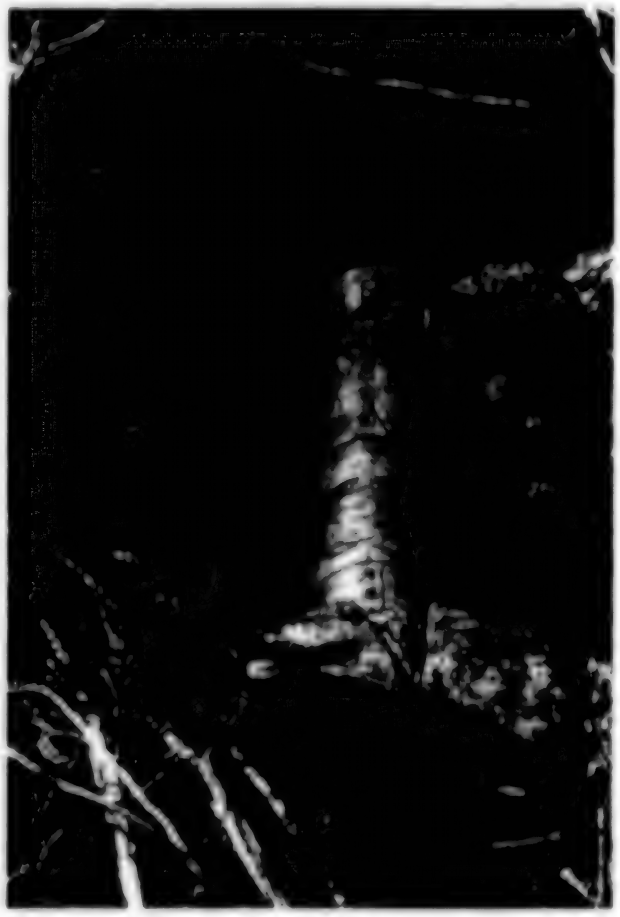


Figure 9.6. Feature 5 at Site 5MV3942: galvanized steel culvert and masonry wall. Facing Southwest.

Interpretation of Site 5MV3942

Site 5MV3942 was comprised of both a prehistoric and historic component. Mesa Verde's prehistoric population attempted to enhance their natural water supply by developing water control systems. They constructed check dams and terraces in natural water drainage areas to trap some of the runoff supply for farming purposes. The soil trapped by these masonry walls would produce adequate conditions for crops while also enhancing the water supply necessary for dry land farming.

After Mesa Verde National Park was established, chronic water shortages plagued the Park during much of its early history. Park officials, discovering prehistoric check dams and terraces constructed in drainage areas, quickly recognized the potential for increasing water supplies by trapping run-off sources. Following the ancient population's example, many such check dams and terraces were also built historically to enhance the Park's water supply. The Park's management took advantage of the Depression Era work relief program and assigned this check dam construction to the Civilian Conservation Corps (CCC) crews stationed at Mesa Verde.

Site 5MV3962 (Spruce Tree Maintenance Yard)

Site 5MV3962, the 1920s Spruce Tree Maintenance Yard, was located on Chapin Mesa in Township 34N, Range 15W in an unsectioned portion of the Moccasin Mesa 7.5' Quad, 1967, elevation 2121 m (6960 ft) behind what is now the Spruce Tree Terrace Concessions Facility. The Spruce Tree Maintenance Yard is significant within the historic context of "The Establishment of Early National Park Service (NPS) Administrative Facilities in Mesa Verde National Park, 1921-1931" (Husband 1984). Construction associated with Phase III of the Mesa Verde Waterline Replacement Project was scheduled to cross the site on its northeast side. Although structures from the maintenance yard were moved to the utility area in the Park, the pipeline was rerouted in an attempt to avoid impact to subsurface features (Figure 9.7). Two pits and two utility trenches were discovered in the reroute area.

Methodology at Site 5MV3962

A Colorado Cultural Resource Survey Management Data Form, and an Historical Archeology Component Form were completed for Site 5MV3962. The foundation for one structure, the Carpenter Shop (#56) had been excavated in 1989 by Jack Smith, then Chief of Cultural Resources at Mesa Verde. The waterline was rerouted in an attempt to avoid this feature and other known subsurface deposits. However, the reroute did

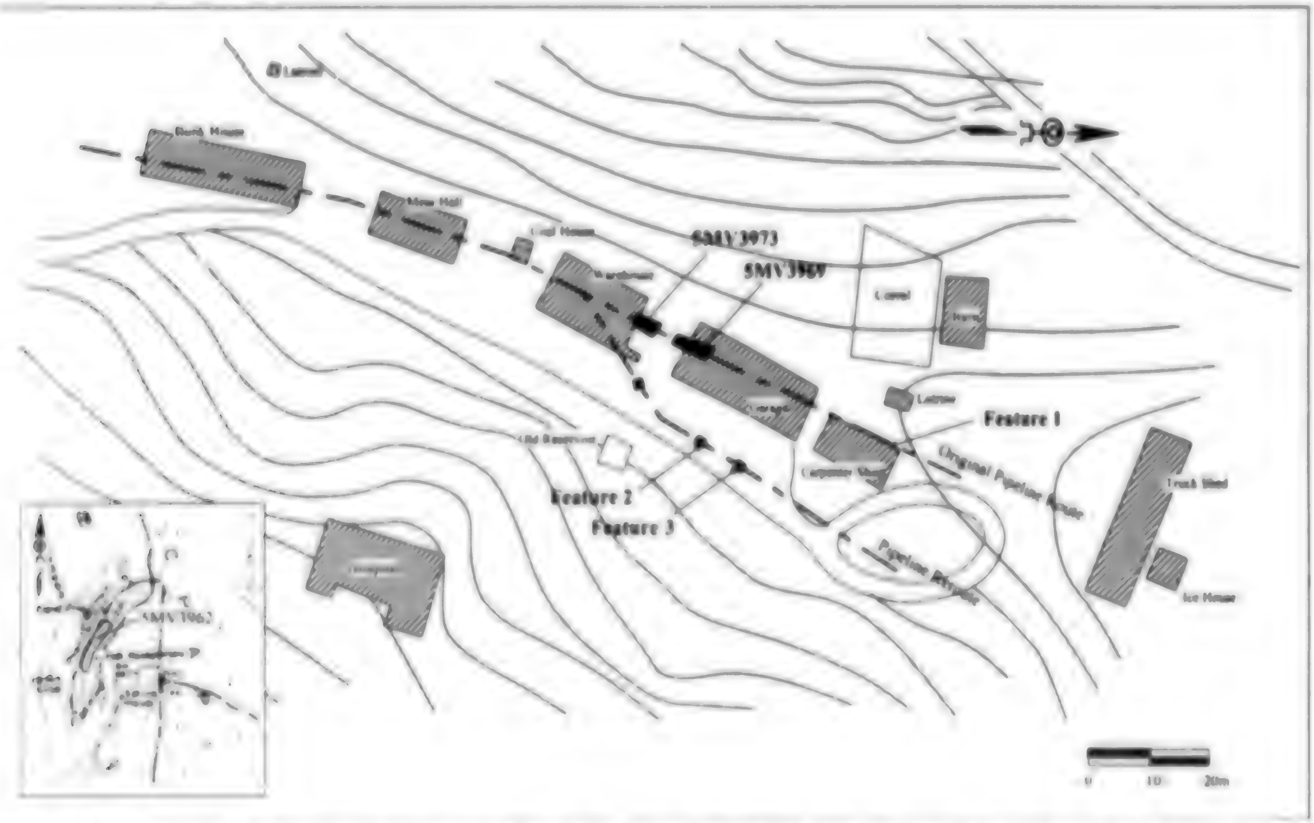


Figure 9.7. Plan view of northern portion of Site 5MV3962, showing locations of buildings from the Spruce Tree Maintenance Yard which have since been relocated or destroyed.

reveal four previously unknown subsurface features. Two pit features were excavated and assigned to this site, while two utility trench features were excavated and designated as site 5MV3973 (to be discussed later in this chapter).

Feature Descriptions at Site 5MV3962

Feature 1 was the foundation for the Carpenter Shop (#56) (Figure 9.8). The building was moved to its current location in the Utility Area in 1934. The old foundation was excavated, photographed, and documented in 1989 by Jack Smith. It was avoided during the construction for the replacement waterline.

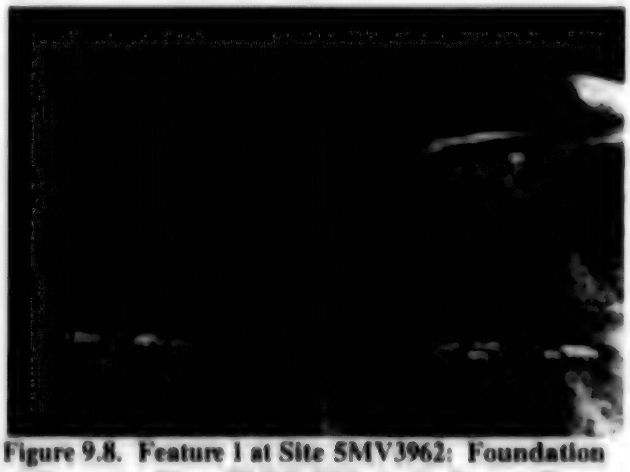


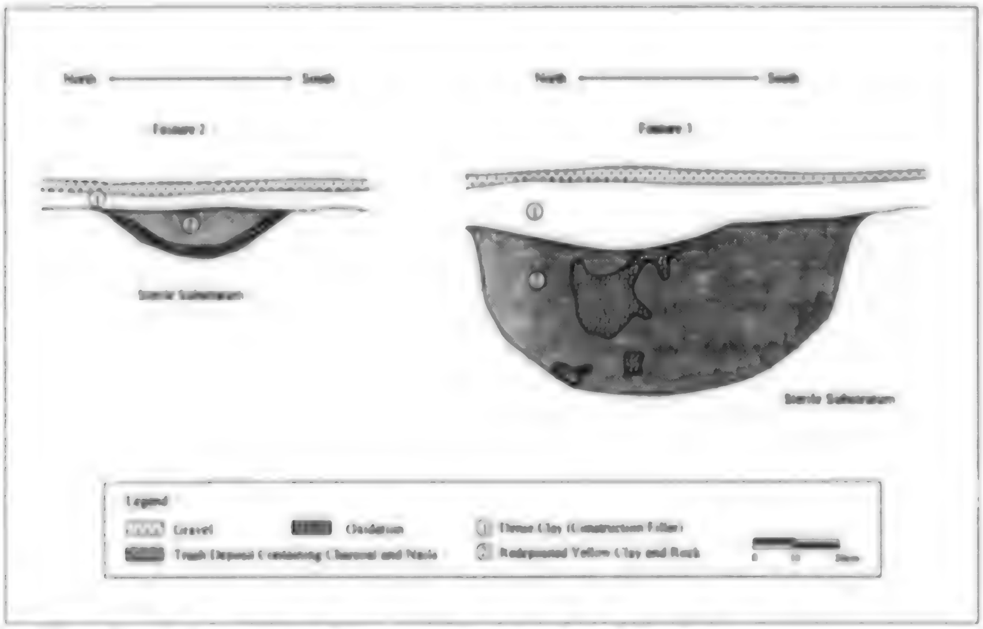
Figure 9.8. Feature 1 at Site 5MV3962: Foundation of Carpenter Shop (BLDG #56), in the Spruce Tree Maintenance Yard.

Feature 2 was an historic trash pit. It was a shallow feature located to the east of the original Garage (#55) (Figure 9.9). The pit was 46 cm in length and 12 cm in depth. It was approximately 6 cm below present ground surface. The feature contained a yellow clay with sandstone fragments, and appeared to have burned. The bottom of the pit contained a black silty and charcoal lens with some oxidation. There were no artifacts present in Feature 2.

Feature 3 was a shallow pit located east of the Garage Building. The feature was discovered 6-20 cm below present ground surface. It was approximately 90 cm in length and ranged from 19-45 cm in depth. The soil in the feature consisted of a yellow clay with interspersed sandstone fragments (Figure 9.9). The pit did not appear burned. However, pockets of black loam containing historic nails and metal fragments were discovered within the feature.

Material Culture at Site 5MV3962

The nails and metal fragments found in Feature 3 were of the same time period as the maintenance yard, the 1920s. No other artifacts were evident on the surface of this site.



North
South
Feature 2
Feature 3
①
②
Sterile Substratum
Legend
Gravel
Oxidation
Dense Clay (Construction Fill)
Trash Deposit Containing Charcoal and Nails
Redeposited Yellow Clay and Rock
0
10
20cm

Figure 9.9. Profile views of Features 2 and 3 at Site 5MV3962.

Interpretations at Site 5MV3962

Site 5MV3962 fits within the historic context of "The Establishment of Early NPS Administrative Facilities in Mesa Verde National Park, 1921-1931" (Husband 1984). Jesse Nusbaum was a significant influence on Mesa Verde, serving as Superintendent from 1921-1931, and returning two more times as Superintendent in the 1930s and 1940s. The Spruce Tree Maintenance Yard was established during his term at Superintendent as part of his attempt to consolidate the Park administration services. A few of the structures built for the first maintenance facility were moved in 1933 to the new maintenance yard built by the workers of the Civilian Conservation Corps. The two historic trash pits and the foundation of the Carpenter Shop remain in their original location.

Site 5MV3963 (Deep Water Well)

Site 5MV3963, the Deep Water Well and Pumphouse, was located approximately one mile north of Park headquarters in Township 34N, Range 15W of an unsectioned portion of the Moccasin Mesa 7.5' Quad, 1967, elevation 2176 m (7140 ft). The deep and shallow water wells, and the old pump are no longer extant. The subsurface reservoir is still used for emergency water storage. The water treatment plant, constructed by the CCC, is extant and used today as the Natural Resources Office (Figure 9.10).

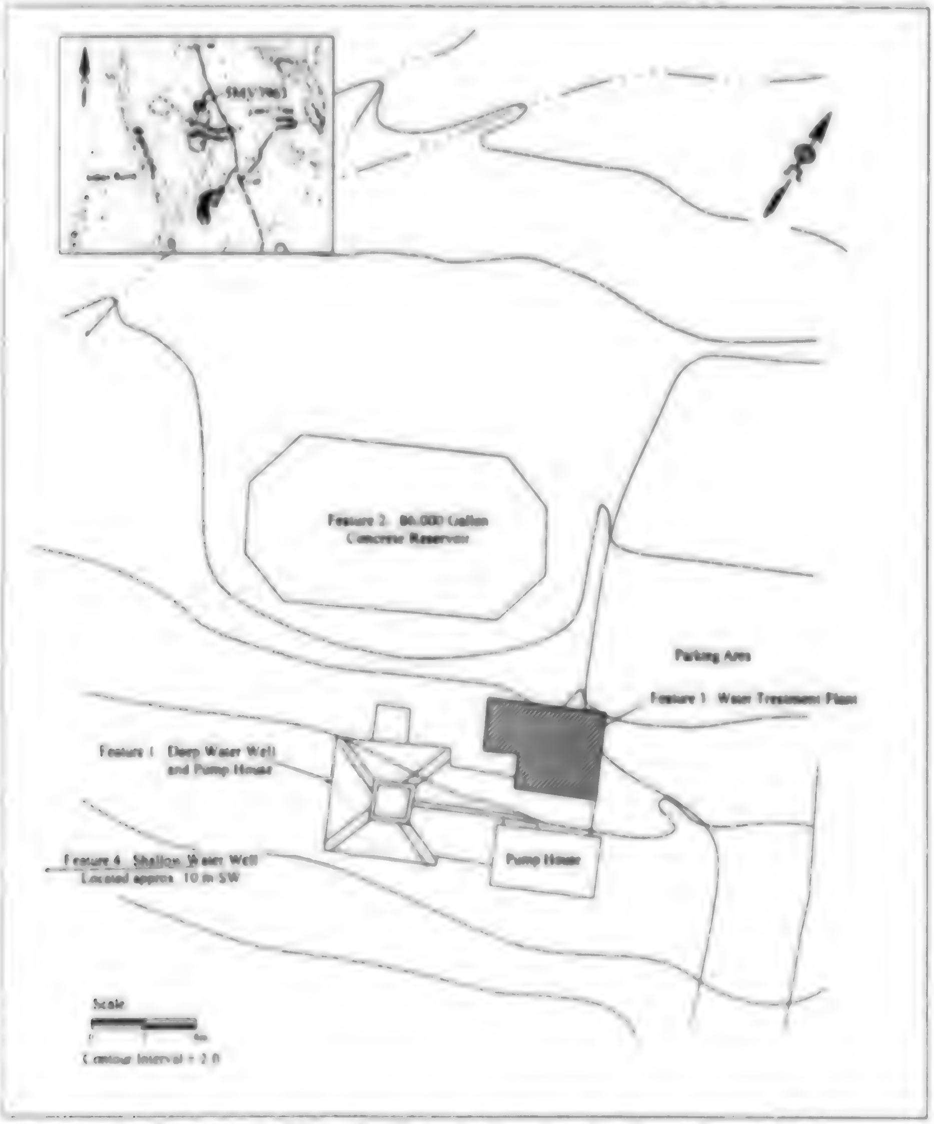


Figure 9.10. Plan view of Site 5MV3963, showing the Deep Water Well, Pumphouse and 86,000 gallon Reservoir.

Methodology at Site 5MV3963

The original route of the replacement waterline was scheduled to pass through site 5MV3963. When this was discovered, the pipeline was rerouted and trenching was completed without the use of heavy equipment to protect the subsurface feature from damage. The site and all of its features were avoided. The forms completed for this Site 5MV3963 included the Colorado Cultural Resources Survey Management Data Form, the Historical Archeology Component Form, and an Historic Architectural Building/Structure Form.

Architecture and Feature Descriptions at Site 5MV3963

Feature 1 was the Deep Water Well and associated pumphouse (Figure 9.11). The well and pump house were situated on a concrete pad constructed by the CCC in 1934. This concrete foundation, located south of the water treatment plant, was all that remained of this feature. The structure was built to house a pumpjack motor and was of a rectangular shape and constructed using corrugated metal. Because of safety concerns the well was filled with concrete after completion of the Mesa Verde Pipeline from the Jackson Lake area in 1951.

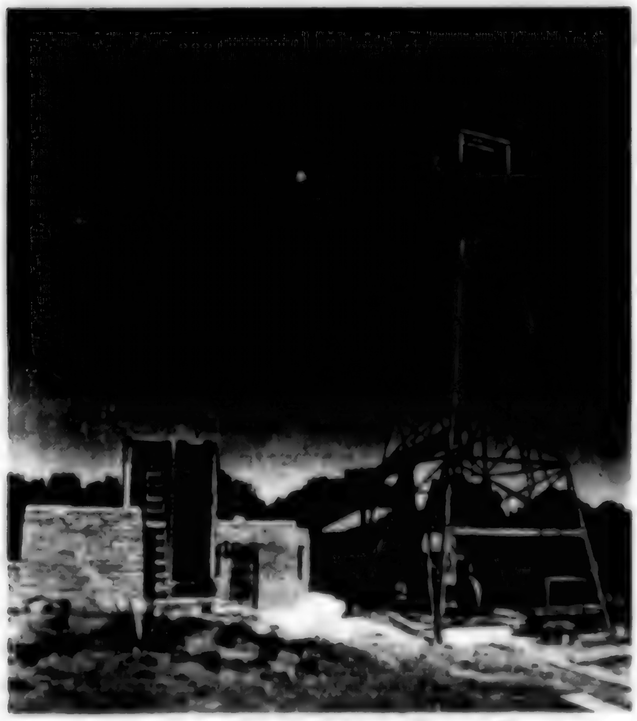


Figure 9.11. Deep Water Well and Pump House (Feature 1) and Water Treatment Plant (Feature 3) at Site 5MV3963 in 1941.

Feature 2 consisted of the remains of the 325,758 liter (86,000 gallon) reservoir. The storage tank was an octagonal, subsurface structure, constructed of reinforced concrete. The exact construction date for the reservoir is not known. However, it was believed to be in place by 1934, shortly after the well was in operation. This tank is still used for storage of emergency water supplies.

Feature 3 was the Water Treatment Plant constructed in the Modified Pueblo Revival Style by the CCC in 1939. The structure was built in an L-shape with a half basement, and was constructed of quarry-faced masonry sandstone blocks. The roof was flat with a stone parapet and constructed with tongue-and-groove wood laid on vigas. The building was used as a storage facility for a time and then converted to the Natural Resources Office in 1981.

Feature 4 was the supplemental shallow water well which was never completed. The feature was excavated west of Feature 1 and was no longer evident on the surface.

Interpretations at Site 5MV3963

Site 5MV3963 was significant within the historic contest of "Depression Era Development at Mesa Verde National Park" (Husband 1984). In an attempt to supplement meager and inconsistent water sources, a plan was devised in 1929 to excavate a well on Chapin Mesa. When water was discovered after three years of drilling, the well's depth had reached 1280 m (4,200 ft) below the surface. Utilizing CCC labor, structures were built to support drilling operations and treat the water supply. The Deep Water Well was a significant source of water for Mesa Verde until it was replaced by the West Mancos Water Supply System 1951. The well and its support structures are an important part of the Park's history and Mesa Verde's continual struggle with a safe and reliable water supply.

Site 5MV3964 (Chapin Mesa Water Catchment and Storage System)

5MV3963, Chapin Mesa Water Catchment and Storage System, was built to supplement the existing water supply being collected at the time by a catchment system above Spruce Tree House. The water catchment system was located in the Hogan Historic District near Park headquarters. It is in Township 34N, Range 15W of an unsectioned part of the Moccasin Mesa 7.5' Quad, 1967, elevation 2145 m (7040 ft). The system consisted of a galvanized corrugated metal catchment, two round steel storage tanks and a concrete storage tank (Figure 9.12).

Methodology at Site 5MV3964

In the spring of 1992, and Assessment of Effect Form and a Colorado Cultural Resource Survey Management Data Form were completed when it was discovered that construction activities for the replacement waterline would impact Site 5MV3964. The extant concrete reservoir was scheduled to be removed as a part of Phase III of the Waterline Replacement Project. However, the dismantling of this tank was ultimately taken out of the scope of work for this construction project. The waterline route did not go through the location of the 946,970 liter (250,000 gallon) concrete reservoir and it was not impacted by construction activities.

When construction for the replacement waterline began in this area, it was thought that the roofs for the two steel tanks had been removed, but that the tanks themselves were still extant. Measures were taken to avoid these subsurface features. However, after testing proved negative, construction eventually proceeded in the original route and the steel tanks were not found. It was later discovered that a 1972 excavation in the same location for installation of a phone line did not find these tanks either. Therefore, it has been concluded that these steel tanks were also removed at an unknown date, sometime before 1972. Thus, there was no adverse impact to any of the features that made up this water catchment system.

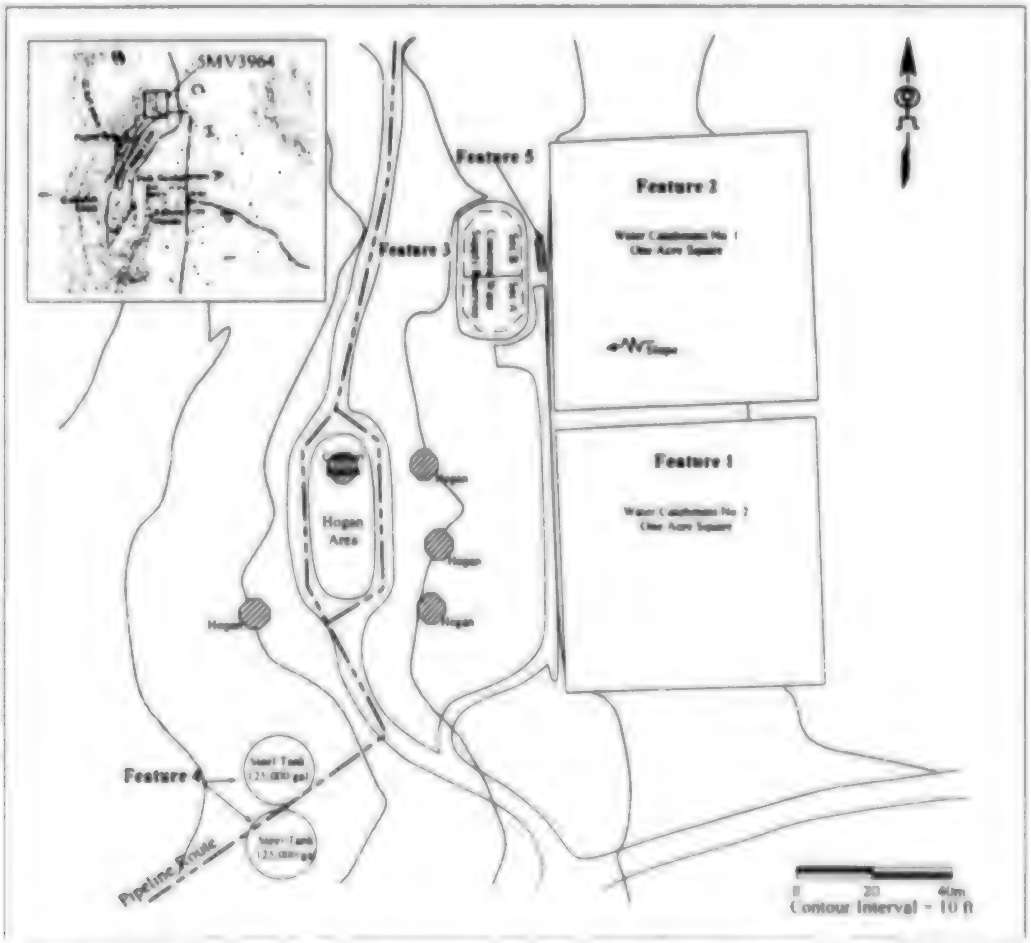


Figure 9.12. Plan view of Site 5MV3964, Chapin Mesa Water Catchment and Storage

Feature Descriptions at Site 5MV3964

Feature 1 was a one-acre catchment system constructed in 1926 from galvanized roofing material. The design of the system consisted of a simple square plan covering one acre of land. The catchment itself was a slightly sloped platform consisting of corrugated roofing material. Metal-lined trenches surrounded the roofing platform to catch water runoff. The entire catchment area was fenced to keep out animals and rodents to prevent contamination of the water source. The materials consisted of small mesh rodent wire approximately .6 m (2 ft) high, 10 cm (4 in) square wire fencing reaching 1.2 m (4 ft) high. All was secured with metal fence posts and barbed wire fencing was placed at the top of the entire enclosure. Although successful in keeping animals from the water source, this fencing was not designed to prevent airborne contaminants from reaching the supply. Pollen from surrounding pinyon and juniper trees collected in the pools, resulting in a strange taste to the water. This catchment system was largely replaced by the Deep Water Well in 1936 and dismantled sometime after 1950. This site has since been highly disturbed and the feature is no longer evident on the surface. This feature was not in the construction right-of-way and was not disturbed by the replacement waterline construction.

Feature 2 was an identical catchment constructed in 1928-29, tangent to the north edge of Feature 1. This catchment was also removed sometime after 1950, and no features remained on the surface. This feature was not disturbed by construction activities for the replacement waterline.

Feature 3 was the 946,970 liter (250,000 gallon) concrete water reservoir divided into two sections. Built in 1929, this reservoir was made from reinforced concrete in an octagonal shape and was located on the east side of Feature 2. It was not visible on the surface but remained intact underground. This tank is still used as an emergency water storage for fire fighting. This feature was avoided during construction activities for the replacement waterline.

Feature 4 consisted of two round steel storage tanks (Figure 9.13). Both tanks were gravity fed with sand filters, and had holding capacities of 473,485 liters (125,000 gallons). Constructed in 1926, these reservoirs were roofed to prevent contamination of the water. However, rodents still found their way into the tanks and contamination was significant. These tanks were removed at an unknown date and were not affected by this construction project.

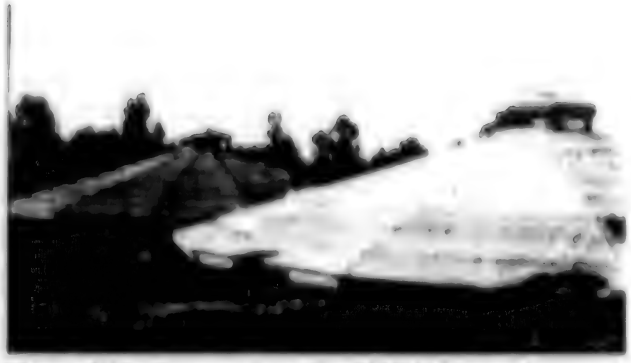


Figure 9.13. Feature 4 at Site 5MV3964, steel storage tanks (Mesa Verde N. P. Archives, Archeological Site Files, photo by Grant, Negative #1056, 1929, Mesa Verde N. P., CO).

Feature 5 was a retaining wall built to prevent soil erosion on the slope between Features 2 and 3. The wall was constructed from rough-cut, quarry-faced native sandstone blocks. It was 1.2 m (4 ft) in length and .6 m (2 ft) in height. This feature was avoided during construction activities and was not impacted.

Material Culture at Site 5MV3964

No artifacts were recovered from 5MV3964. However, documentation is fairly comprehensive on these features and construction dates and historical context have been noted in these records.

Interpretations at Site 5MV3964

Site 5MV3964 fits within the historical context of "The Establishment of Early National Park Service (NPS) Administrative Facilities at Mesa Verde National Park (Husband 1984). In 1926, a galvanized corrugated metal catchment was constructed near Park headquarters. Two round steel tanks, each with holding capacities of 473,485 liters (125,000 gallons), were installed underground for water storage. These tanks were abandoned in 1929 when a concrete storage tank, with a holding capacity of 946,970 liters (250,000 gallons), was constructed. This system, in operation until 1936, was largely replaced when the Deep Water Well was completed in 1934. Sometime after this system was abandoned, the water catchments were removed. The steel tanks were also dismantled at an unknown date. Although the Chapin Mesa Water Catchment System was fully operational for only eight years, it was a significant part of Mesa Verde's early solution to unstable water supplies.

Site 5MV3965 (Spring Water Storage Tank)

Site 5MV3965 was the 340,909 liter (90,000 gallon) capacity subsurface Spring Water Storage Tank located near the CCC Campground. It was constructed from reinforced concrete in an octagonal shape. Located in Township 34N, Range 15W of an unsectioned part of Moccasin Mesa 7.5' Quad, 1967, elevation 2136 m (7010 ft) the site lies southwest from the Chapin Mesa Water Catchment System (Figure 9.14).

Methodology at Site 5MV3965

For Site 5MV3965, a Colorado Cultural Resource Survey Management Data Form and an Historical Archeology Component Form were completed. Construction for Phase III of the Waterline Replacement Project did not pass through the area in which this tank was located. However, it was scheduled to be dismantled as part of the waterline construction project. These plans were changed and the tank was left intact and undisturbed.

Feature Description at Site 5MV3965

Feature 1 was the octagonal-shaped concrete reservoir (Figure 9.15). With a 340,909 liter (90,000 gallon) capacity, it was constructed underground with no features evident on the surface. The construction date for this tank could not be determined. However, because of its proximity and similar design to the 473,485 liter (25,000) gallon concrete reservoir at the Chapin Mesa Water Catchment System, it is believed that this tank was constructed at the same time, ca 1926.

Material Culture at 5MV3965

No artifacts were found at this site and no features were evident on the surface. Records regarding a construction date or time period for use have not been found. However, the tank is displayed on a CCC Administrative Map dated 1934.

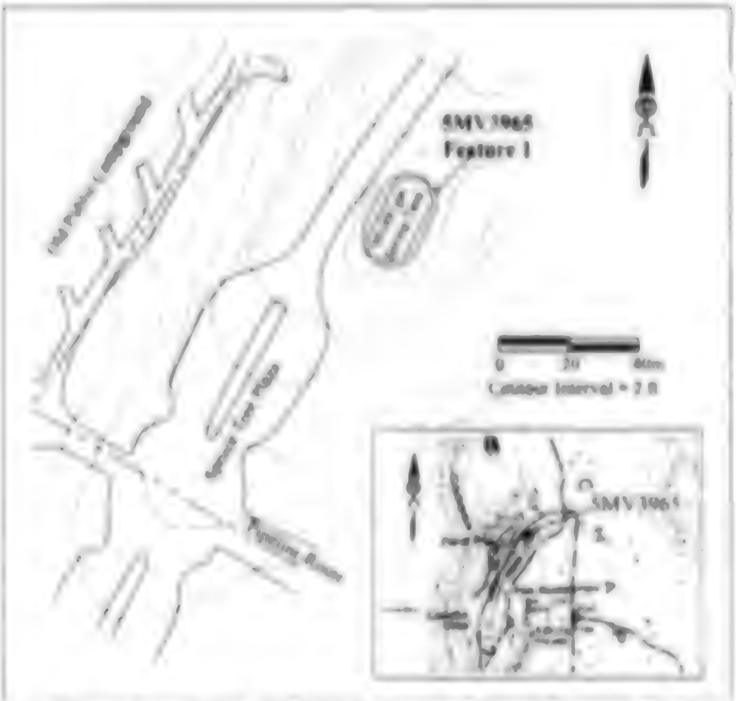


Figure 9.14. Plan view of Site 5MV3965, Spring Water Storage Tank.

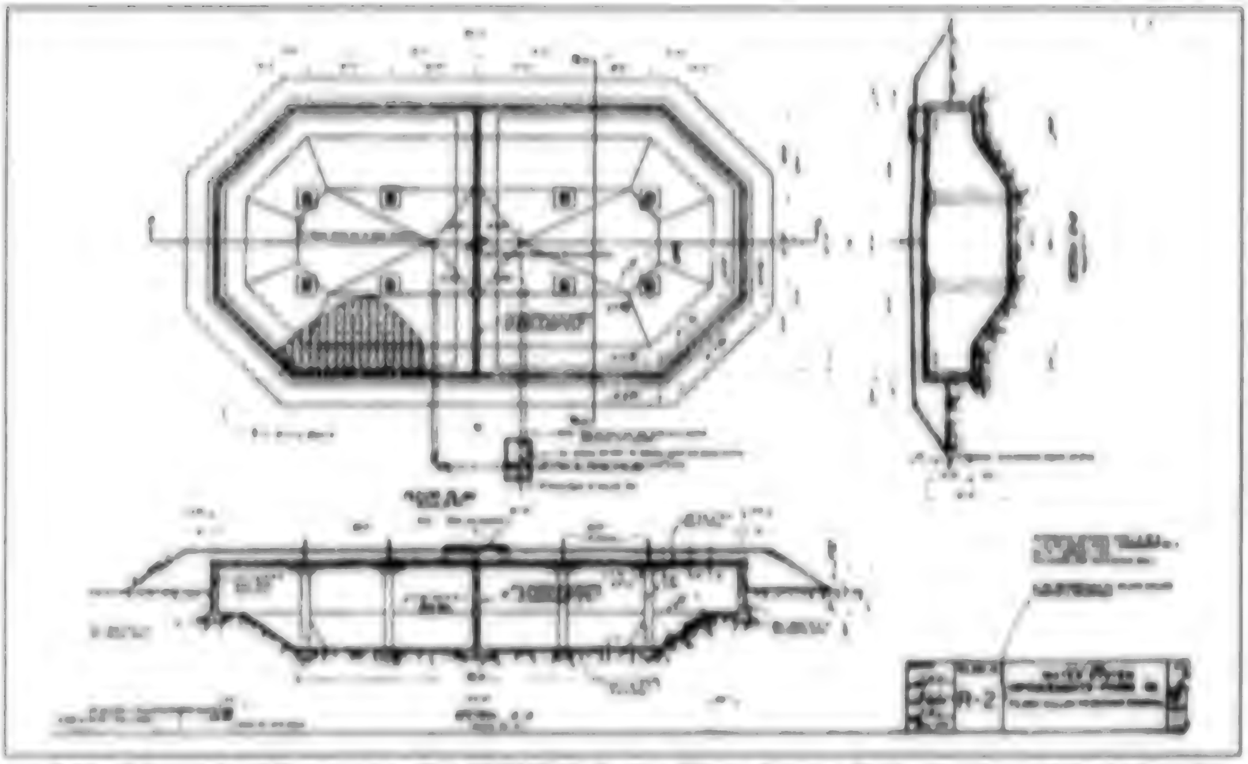


Figure 9.16. Schematic of Feature 1 at Site 5MV3965, Spring Water Storage Tank, showing original plans for alterations during Phase III of the Waterline Replacement Project (Mesa Verde N. P. Archives, Accession #1357, 1991, Mesa Verde N. P., CO).

Interpretations at Site 5MV3965

Although no construction date can be obtained for this concrete reservoir, evidence suggests that it was probably built at the same time, and used as a part of, the Chapin Mesa Water Catchment System. Similar design and construction materials, as well as its proximity to features at site 5MV3964 suggest association. The tank still holds a water supply for fire fighting and was utilized during the Long Mesa Fire in 1989.

Site 5MV3966 Feature 2 (Historic Trash Pit)

Site 5MV3966 was a two component site consisting of a prehistoric pottery firing kiln and an historic trash pit contained within the historic CCC campground (5MV3941). The site was located and mitigated during waterline trenching activities. The eastern edge of the kiln was destroyed by construction. In order to protect the site from further damage, the feature was recorded and excavated. During excavation, a second feature (Feature 2) was discovered which proved to be a burned pit containing historic refuse.

Located in Township 34N, Range 15W in an unsectioned part of the Moccasin Mesa 7.5' USGS Quad, 1967, elevation 2152 m (7060 ft). 5MV3966 Feature 2 consisted primarily of a single straight-sided pit excavated into sterile soil. The overburden included construction debris from the 1930s when the CCC built the campground. Recent waterline debris was also found on the surface surrounding this site. The fill within the feature consisted of a dark-gray to black soil with a significant organic content, fired sandstone, and fragments of oxidized soil.

Methodology at Site 5MV3966

A Colorado Cultural Resource Survey Management Data Form and an Historical Archeology Component Form was completed on the site. Once site 5MV3966 was encountered and damaged by trenching activities, mitigation took place in the form of excavation. In order to recover significant data pertaining to prehistoric ceramic firing technology, a full excavation of the kiln was performed. The burned historic pit was discovered during the kiln excavation. Both features were excavated according to natural stratigraphic

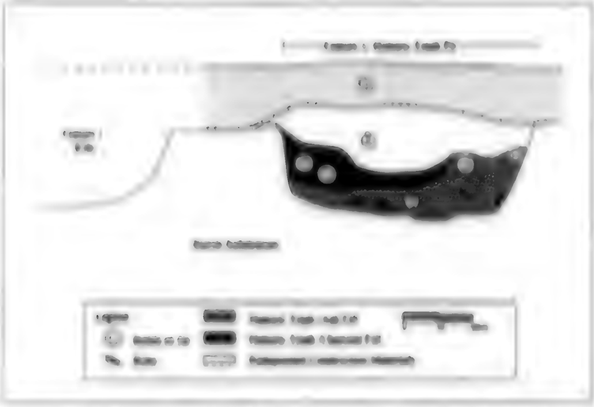


Figure 9.16. Profile of Feature 2 at Site 5MV3966.

layers. The prehistoric kiln (Feature 1) is reported with others found during the Mesa Verde Waterline Replacement Project Phase III in another chapter.

Feature Description at Site 5MV3966

Feature 2 at Site 5MV3966 was an historic trash pit containing burned debris. Due to historic disturbance from campground construction, it was in the same vertical plane as Feature 1.

This feature was excavated in three levels according to natural stratigraphy (Figure 9.16). Stratum 1 was overburden consisting of construction debris from the current waterline project and the building of the campground in the 1930s. The soil was a yellow to tan silty clay with interspersed fragments of oxidized sandstone and charcoal.

Stratum 2 was a redeposited sterile layer consisting of a loamy clay soil. It was at this level that the dimensions of the feature became evident. The feature was 72 by 74 cm and was 30 cm in depth. No artifacts were recovered from this stratum.

Stratum 3 contained remnants of ash and charcoal intermixed with burned trash and food scraps. At this level, the feature had retained the measurement of 72 cm by 74 cm by 30 cm. Artifacts were recovered from this stratum.

Material Culture at Site 5MV3966

Artifacts recovered from Feature 2, Stratum 3 of Site 5MV3966 included non-human bone, an historic burned textile, glass, metal, a clothing button, and an egg shell fragment.

Interpretations of Site 5MV3966

At Site 5MV3966, Feature 2 was an historic trash pit which contained burned refuse. This feature most likely was used in the Depression Era 1930s and was utilized during the construction of the CCC campground. During the building of this campground, leveling activities took place which involved grading the ground surface and filling low areas to produce level ground surfaces suitable for camping. When these ground leveling activities took place, the historic pit was placed on the same horizontal plane as Feature 1, the prehistoric pottery firing kiln. The deposits of the two features were intermixed at that time. The artifacts found within Feature 2 tend to link this feature to the historic context of "Depression Era Development at Mesa Verde National Park, 1931-1942" (Husband 1984).

Site 5MV3973 (Utility Trenches)

Site 5MV3973 consisted of two utility trenches associated with the 1920s Spruce Tree Maintenance Yard. It was located in Township 34N, Range 15W in an unsectioned part of the Moccasin Mesa 7.5' Quad, 1967, elevation 2109 m (7010 ft). The northern pit was an electrical utility trench, while the southern trench was utilized for a waterline. The features were discovered by trenching activities associated with the Mesa Verde Waterline Replacement Project Phase III. The site was not considered significant or contributing to an historic context.

Methodology at Site 5MV3973

A Colorado Cultural Resource Survey Management Data Form and an Historical Archeology Component Form were completed for Site 5MV3973. The site was tested to determine function of the two trenches. The pits were excavated and profiles were drawn (Figure 9.17).

Feature Description at Site 5MV3973

Feature 1 was an historic utility trench. The pit was discovered immediately below the asphalt layer and was 1.1 m in depth and 1.25 m in width. The soil contained in the pit was a single stratum of light brown silty loam. Historic artifacts found within the trench included four 3" finishing nails and a 2" power cable.

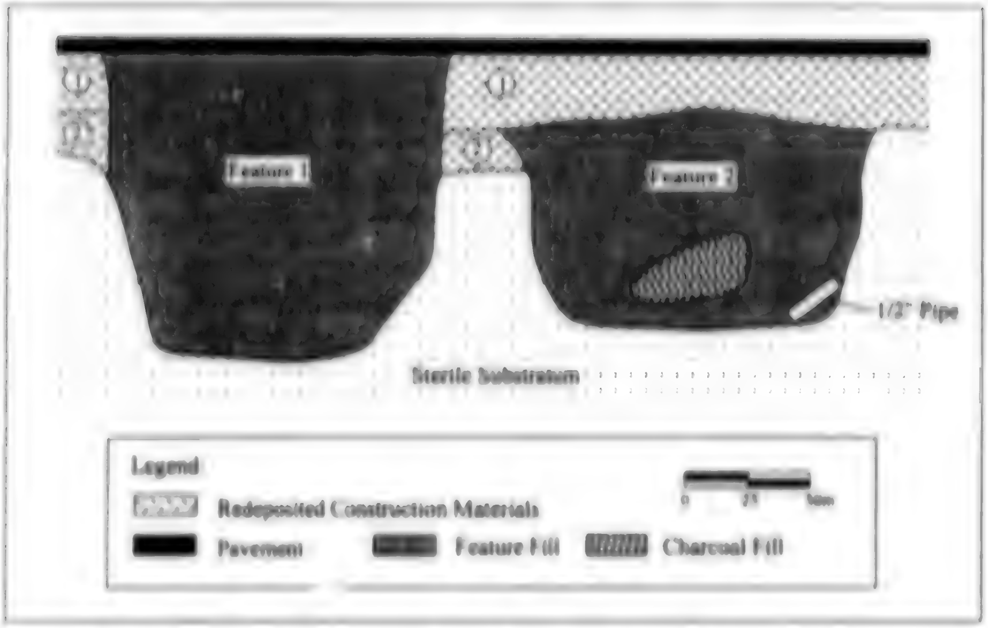


Figure 9.17. Profile view of Features 1 and 2 at Site 5MV3973.

Based on the presence of the power cable and historical record, this feature was probably constructed in 1943, when the power cable was installed. The nails were manufactured ca. 1929-35, but were probably mixed into the trench fill during backfilling.

Feature 2 was also an historic utility trench 1.21 m in width and .78 m in depth. The soil contained within the pit consisted of a mottled light brown to medium brown silty loam. Interspersed in the fill were historic artifacts, native bedrock fragments, and a concentration of charcoal. On the floor of this pit was a 2 ½" water pipe. The artifacts included pieces of clear flat window glass, a porcelain electrical wire insulator fragment, and a corroded metal bolt. Historical records indicate that this trench was excavated in the early 1940s for installation of this 2 ½" waterline. The debris in the pit may be associated with the demolition of the 1920s Spruce Tree Maintenance Yard, and probably was mixed in with the backfilling of this trench.

Material Culture at Site 5MV3973

All of the artifacts recovered from the two features at site 5MV3973 were made between 1929-35. However, historical documentation indicated that a utility trench was excavated in this area during the early 1940s for the installation of a water pipe. The appearance of this pipe in Feature 2 suggests that this is the same trench and the historic artifacts recovered were mixed into the fill during backfilling.

Interpretations at Site 5MV3973

Site 5MV3973 was the remains of two utility trenches, one electrical and one for a waterline. Artifacts in both trenches indicated use during the 1940s.

Other Historic Features Affected On Chapin Mesa

In addition to the seven recorded historic sites on Chapin Mesa which were affected by the Mesa Verde Waterline Replacement Project Phase III, an historic corral and some isolated metal artifacts were also investigated during construction activities.

It was discovered during construction for the replacement waterline that the designated right-of-way would go through an historic corral site. The water pipeline was rerouted and the corral was avoided. There was no adverse effect to this site. The existing features of the corral consisted of standing posts measuring 6 in in diameter and approximately 5 ft in length. Barbed wire used as fencing material also remained. The corral was used by concessionaires for their pack horses from approximately the 1920s-1960s. The names of the original owners could not be determined. The last concessionaire, Kopenhafer, bought the pack operation in 1948. Before that time, the corral and accompanying pasture were used on a full-time basis for rounding up pack horses. After Kopenhafer took over the business, the area was used only occasionally to rest horses. The pasture extended from the location of the corral up to the Far View area in Mesa Verde National Park (Personal communication, Richard Greenlee, Mesa Verde National Park Division of Maintenance, to Julie Bell, Mesa Verde National Park, Division of Research and Resource Management, Oct. 26, 1995).

During trenching activities on Spruce Tree Point near Residence #1, (Station 15+00) isolated historic metal artifacts were discovered in the backfill. These items were collected and the trench was monitored. The artifacts included a spark plug probably dating to the 1920s (Personal communication, Bob Bangs, Mesa Verde National Park Division of Maintenance, to Gay Ives, Mesa Verde National Park Division of Research and Resource Management), nails, and a chain. The original Park hotel was constructed on Spruce Tree Point. A gas station, associated with the hotel, was located in the approximate location of these finds. The presence of the spark plug suggests that these artifacts were affiliated with that gas station and date to the 1920s.

Summary and Conclusions Mesa Verde Segment Testing and Excavation

Ten archeological sites were excavated or tested on Chapin Mesa as a result of Phase III of the Mesa Verde Waterline Replacement Project. Four prehistoric features were excavated due to inadvertent impact by construction activities 5MV3970 (hearth), 5MV3971 (bell shaped pit), 5MV3987 (hearth), 5MV3978 (burial). Seven historic sites were investigated 5MV3942 (historic check dam with prehistoric check dam component) was avoided by rerouting the pipeline. 5MV3962 (Old Spruce Tree Maintenance Yard) was avoided by rerouting the pipeline and two pits were excavated when encountered in the route. 5MV3963 (Deep Water Well and Pump House) was avoided during construction. 5MV3964 (Chapin Mesa Catchment and Storage System) was not impacted by the pipeline construction. 5MV3965 (Spring Water Storage Tank) was left undisturbed by the construction activities. 5MV3966 (Feature 2-Historic Trash Pit) was excavated. 5MV3973 (Utility Trenches) were excavated. In addition, an historic corral was avoided during construction and historic artifacts were curated from areas near the original Park hotel garage.

Three of the prehistoric features (5MV3970, 5MV3971, 5MV3987) were not spatially related to a recognizable habitation site. Site 5MV3978 was probably associated with a nearby Basketmaker III habitation site. The documentation of historic features adds to our knowledge of the historic contexts of "The Establishment of Early National Park Service (NPS) Administrative Facilities in Mesa Verde National Park 1921-1931" and " Depression Era Development at Mesa Verde National Park" (Husband 1984).

CHAPTER 10

MESA VERDE SEGMENT POTTERY FIRING KILNS

Joel M. Brisbin

Introduction

This chapter focuses on the description and interpretation of nine prehistoric pottery firing kilns found at seven archeological sites excavated along the western side of Chapin Mesa, Mesa Verde National Park (5MV3899, 5MV3966, 5MV3967, 5MV3969, 5MV3972, 5MV3945, 5MV3982)(Figure 10.1). Construction associated with the Mesa Verde Waterline Replacement Project Phase III impacted these sites and mitigation work was required.

The nine trench kilns are significant for two reasons. First, they all date to the early to middle Pueblo II period while all previously reported kilns, with one exception, have dated to the Pueblo III period. Second, the uppermost layer of soil in the kiln site deposits was recognized as a prehistoric cultural level rather than post abandonment fill. This uppermost stratum was interpreted as a smothering layer of dirt applied by the prehistoric potters to effectively halt the limited oxidation process of the pottery firing.Once this smothering stage was recognized, replicators were able to successfully imitate an Anasazi firing regime and obtain consistent results in the production of black-on-white pottery. The details of the successful Anasazi pottery firing experiments are reported in a section of this chapter by Clint Swink, Anasazi pottery replicator.

History of Kiln Research

The first time that a pottery kiln was defined as such in the Southwest United States was in 1973 when Claudia Helm excavated and reported on a slab lined thermal feature which she interpreted as a pottery firing kiln (Helm 1973; Purcell 1993:3). Others, as early as 1958, had excavated such features and either suggested that they might be pottery firing kilns or simply interpreted them as a thermal feature (Reed 1958). Until recently most researchers, using an ethnographic

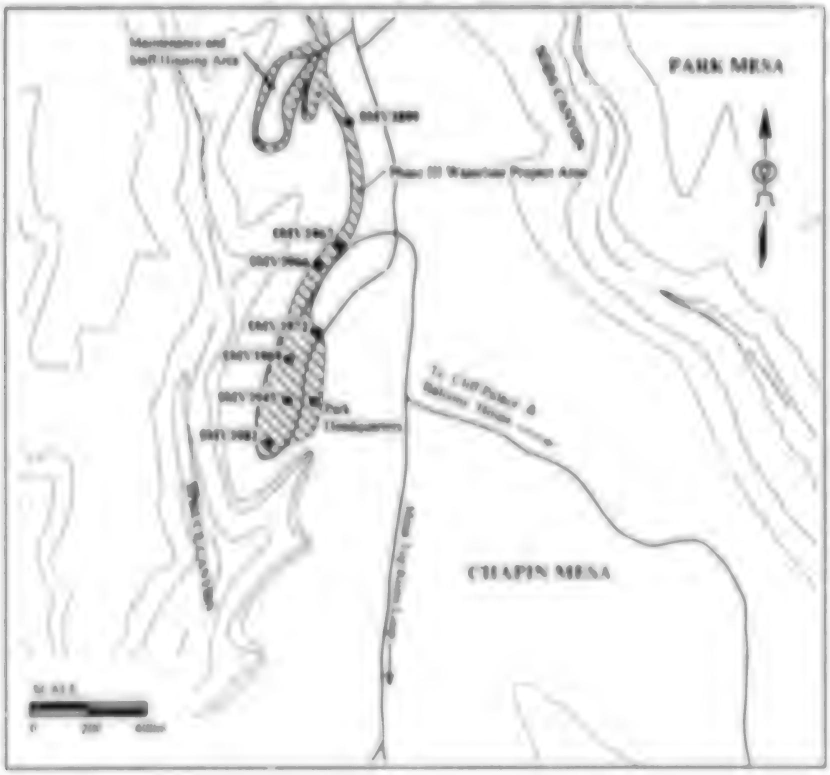

Maintenance and Staff Housing Area
PARK MESA
Phase III Waterline Project Area
Park Headquarters
To Cliff Palace & Balcony House
CHAPIN MESA
SCALE
0
200
400m

Figure 10.1. Location of seven sites containing the nine excavated kilns on Chapin Mesa.

model, believed that the prehistoric potters fired their wares within their pueblo using an open air firing regime which would have left little archeological residue. Due in large part to widespread archeological surveys and mitigation work connected with energy development in the 1980s and 1990s, it has been firmly established that the old ethnographic model does not explain all the prehistoric archeological evidence. It has now been shown that prehistoric Anasazi pottery was fired in slab lined trench kilns which were located in marginal areas some distance from habitation sites (Fuller 1984). Twenty-nine such features have been excavated and reported in the Four Corners Region of the southwestern United States. Of this total, 25 have been located in southwest Colorado, two in southeast Utah and two near Santa Fe, New Mexico.

The phenomenon of the kilns has produced a ripple effect in the archaeological pond. New avenues of inquiry and research have been opened into the realm of ceramic production and distribution throughout the greater Southwest. Along with a detailed description of the nine kilns excavated in Mesa Verde National Park, some of the questions raised by the kiln phenomena will be addressed in this chapter.

The Kiln Sites Setting

Nine kilns were excavated on Chapin Mesa as part of the mitigation work associated with the Mesa Verde Waterline Replacement Project Phase III (Table 10.1, Figure 10.1). All the kiln features were found along the western side of Chapin Mesa on two narrow mesa fingers extending southwest into Spruce Canyon. The kilns were located in an area 1.7 km long (north to south) and no greater than 50 m wide. The whole of Chapin Mesa extends from the north escarpment of Mesa Verde southward to the Mancos River. Only the upper half of this mesa falls within the Park boundary and the lower half is on the Ute Mountain Ute Reservation. Therefore in a broad geographical sense the kilns are located near the center of Chapin Mesa in pinyon-juniper forest with serviceberry understory. Historically, this is the most heavily utilized area of the Park and is the area where housing, maintenance, and administration buildings and activities are found today. From 1906 to the present this area has received a tremendous amount of ground altering impact and it is rather surprising that any of these prehistoric features have remained intact.

Of the two fingers of Chapin Mesa on which the kiln sites were found, the northern had only one site (5MV3899) consisting of two kilns. The remaining kilns were found on the southern finger. The kiln locations are all close to 2255 m (7400 ft) in elevation. Section numbers have never been assigned to most of this portion of Chapin Mesa within the Park boundaries but it is clear that the kiln features are located in Township 34 North, Range 15 West. This area of Chapin Mesa was intensively occupied during the Pueblo II period (A.D. 900-1150), the period relevant to the nine prehistoric pottery firing kilns.

The Chapin Mesa Kiln sites will first be described in terms of the individual architectural details and stratig-

Table 10.1. Dimensions of Kilns Excavated on Chapin Mesa during the Waterline Replacement Project

Site # / Feature #	Length (cm / *in*)		Width (cm / *in*)		Depth (cm / *in*)	
5MV3899 / Feature 1	170	*66.3*	90	*35.1*	30	*11.7*
5MV3899 / Feature 2	210	*81.9*	130	*50.7*	40	*15.6*
5MV3966 / Feature 1	170	*66.3*	*115	*44.8*	35	*13.6*
5MV3967 / Feature 1	265	*103.3*	*115	*44.8*	45	*17.5*
5MV3969 / Feature 1	255	*99.4*	140	*54.6*	30	*11.7*
5MV3969 / Feature 2	145	*56.5*	95	*37.0*	33	*12.9*
5MV3972 / Feature 1	420	*163.8*	150	*58.5*	50	*19.5*
5MV3945 / Feature 1	165	*64.3*	112	*43.7*	60	*23.4*
5MV3982 / Feature 1	***	***	***	***	*40	*15.6*

* Incomplete data exists for these dimensions

raphy of the features. Results of the material culture, dendrochronological, and macrobotanical analyses from all of the features will then be discussed and compared. Finally an interpretation of the feature stratigraphy and social organization implied by the data will be discussed.

Site 5MV3899

Site 5MV3899 consisted of two kilns (Feature 1 and Feature 2) and a third feature (Feature 3) probably related to both kilns (Figures 10.2 and 10.3). These features were located approximately 100 m south of the Mesa Verde National Park Maintenance Division's equipment yard within the existing utility line corridor. Feature 2 was located along the east edge of a foot trail and was the only kiln that had previously been recognized and recorded. In order to bypass this feature the pipeline trench was relocated to the west where no surficial evidence was present to indicate any additional cultural features. This surface assessment proved to be misleading and Feature 1 was impacted by the pipeline trench. Fortunately the feature was recognized quickly and the impact was minimal. Both features were situated across a small drainage, on a southwest facing hillside. This hillside drains into a secondary tributary of Spruce Canyon 50 m south. The slope down to the rim of this secondary drainage is 1% and drops sharply to 20% from the rim to the bottom of the drainage.

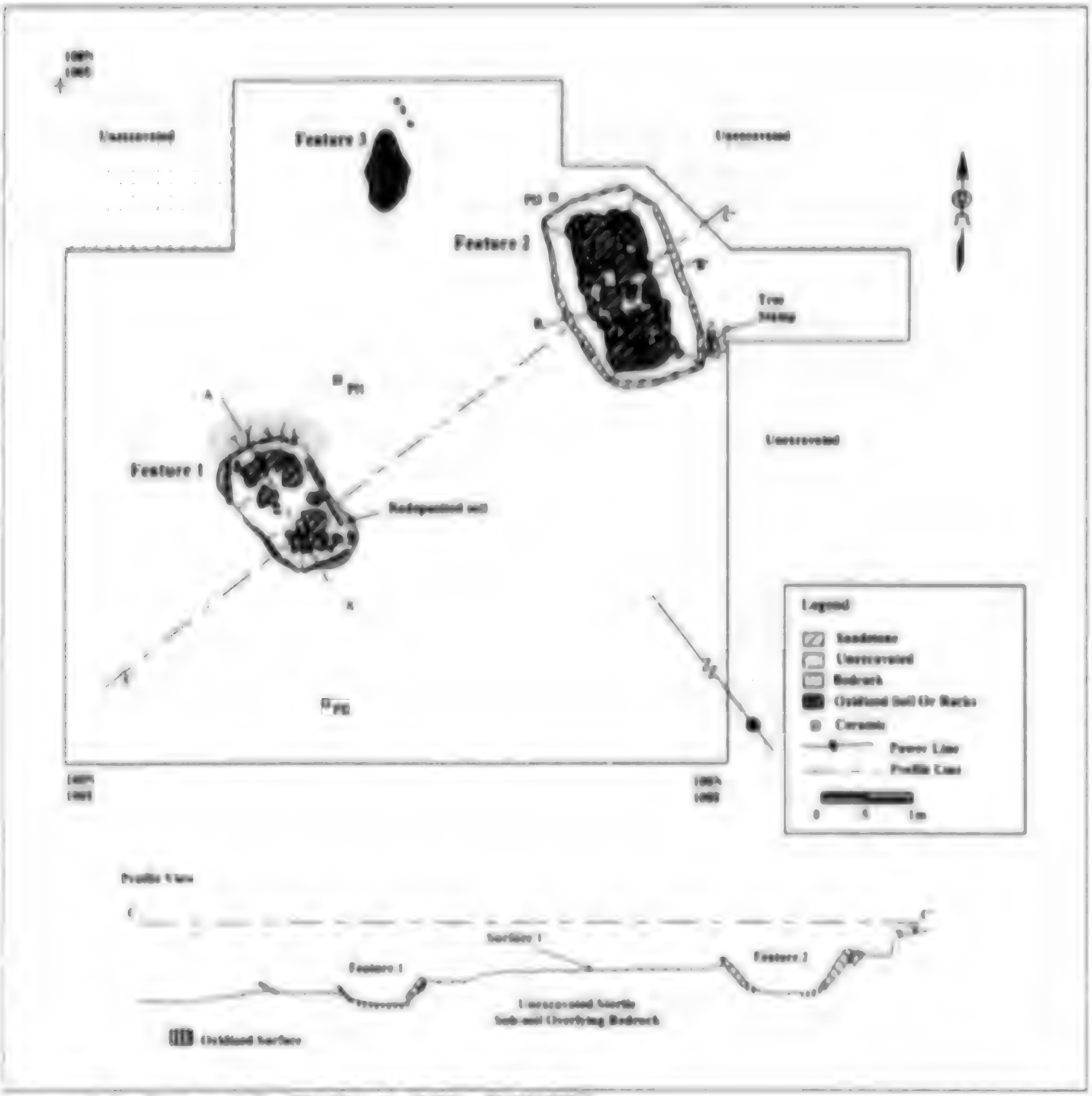


Figure 10.2. Plan and Profile Views of Site 5MV3899.

Figure 10.3. Excavated kilns at Site 5MV3899, looking south.

Feature 1 at Site 5MV3899

In plan view Feature 1 was rectangular with slightly rounded corners. Feature 1, in profile, was relatively flat on the bottom; and the walls of the pit flared outward an average of 30 degrees from the vertical.

Construction of Feature 1 Site 5MV3899

Feature 1 was dug into a shelf of decomposing bedrock, and the walls of the pit were lined with 11 pieces of tabular sandstone. The slabs ranged from 15 to 83 cm in width and from 20 to 48 cm in height. The average thickness of the slabs was 6.8 cm. These lining slabs were soot blackened on their interior faces, but oxidized from interior to exterior beneath the patina of soot. The excavation of the pit through the decomposing layers of sandstone left the pit with an uneven or jagged appearing face in profile. Due to this unevenness, pockets and hollows were created behind the slabs which had to be filled. The pockets behind the slabs which reached above the bed rock to the prehistoric ground surface were filled with compacted redeposited sterile soil. The hollows behind the slabs below the bedrock were left and eventually filled with ash and charcoal which filtered through the vertical spaces left between the lining slabs. The slabs were not mortared into place or were any other construction materials used (Figure 10.4). The base of three of the slabs was above the floor level of the feature, resting on charcoal and ash impregnated soil.

Stratigraphy of Feature 1 Site 5MV3899

There were 5 stratigraphic levels associated with Feature 1. Two of these were interpreted to be the result of historic ground disturbance and three were prehistoric in nature (Figure 10.5). The deepest stratum, Stratum 5, was dark gray to black and consisted almost entirely of carbonized organic material. This stratum averaged 18 cm in depth and contained both large

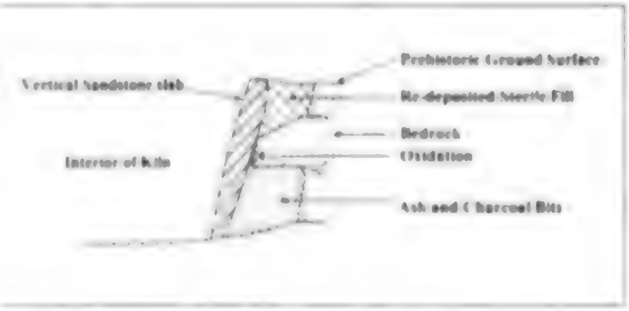


Figure 10.4. Schematic drawing of stratigraphy behind slabs of kiln lining.

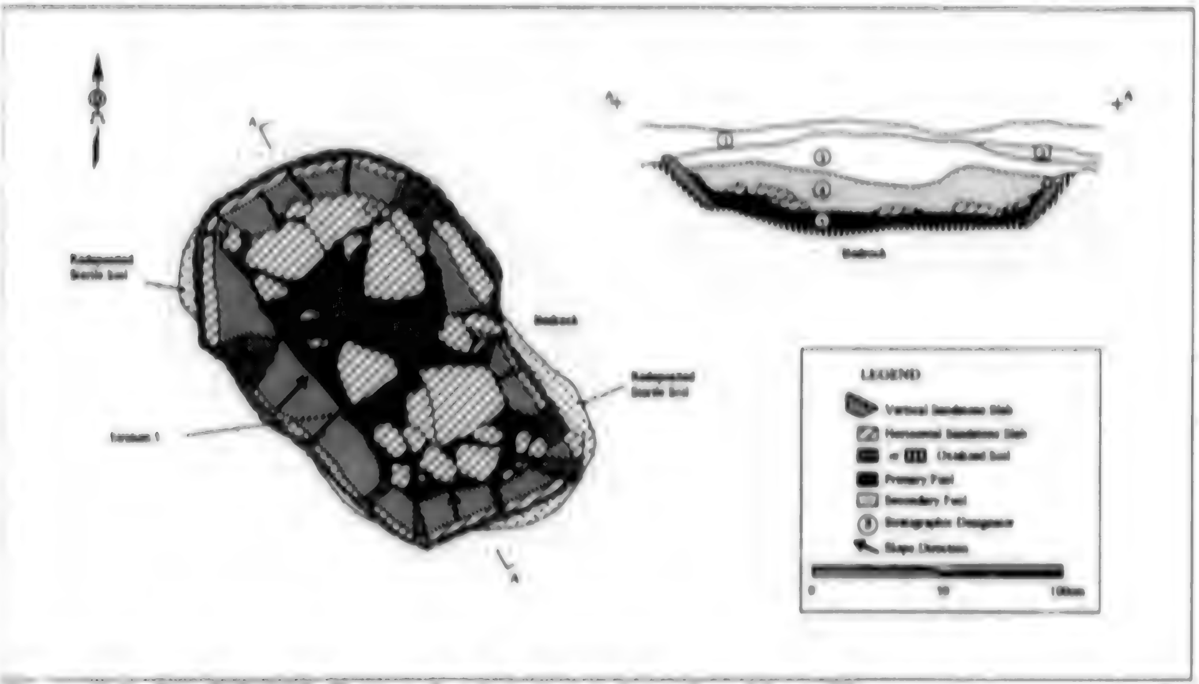


Figure 10.5. Site 5MV3899, Feature 1: plan view and stratigraphic profile.

and small pieces of charcoal. Lying at or near the top of this stratum was a noncontiguous layer of blocky and angular sandstone slabs which has been interpreted as "kiln furniture" (Blinman 1993). This layer of stone also was smudged with a layer of carbon, but beneath the carbon the stones were 100% oxidized. Stratum 4 was a dark brown to gray silty loam interspersed throughout with fragments of carbonized wood and occasionally a spall of oxidized sandstone. The charcoal fragments associated with this stratum were not as numerous or as large as those found in Stratum 5. The final cultural layer in Feature 1 was Stratum 3. This was a tan to light brown silty loam with small inclusions of charcoal and some small fragments of both burned and unburned sandstone. This stratum was made up primarily of redeposited sterile soil. Stratum 2 and Stratum 1 appeared to be post abandonment deposits resulting from historic disturbances dating from the 1930s to the present. A corridor was cleared down the length of Chapin Mesa at the time the first power line was installed or at the time the initial waterline was installed. It is unclear which came first, but it was probably the waterline in 1951. At this time trees and brush were cleared and, when needed, the ground was leveled. This first bit of clearing was responsible for Stratum 2 and the Waterline Replacement Project Phase III construction was largely responsible for Stratum 1.

Feature 2 at Site 5MV3899

Feature 2 at Site 5MV3899 was located 3.5 m northeast of Feature 1. It was in the same shallow drainage as Feature 1 but located further up the slope. Its orientation perpendicular to the drainage was also the same as Feature 1.

Feature 2 had a rectilinear plan view and was flat bottomed with sloping sides in profile (Figure 10.6). The sides were lined with 15 unmortared tabular sandstone slabs. The slabs along the east wall sloped outward at 30 degrees from the vertical while those along the west side inclined an average of 20 degrees from the vertical. The north and south walls sloped outward at 25 degrees.

Construction of Feature 2 Site 5MV3899

Feature 2 was higher on the slope than Feature 1 and as a result was built into a layer of soil rather than bedrock. The initial pit excavated into this soil was 34 cm deep on the uphill side and 32 cm on the downhill or west side. The slabs were aligned around the edges of the pit directly against the earthen face of the pit. The soil behind and under these slabs as well as across the floor formed a continuous line of oxidation.

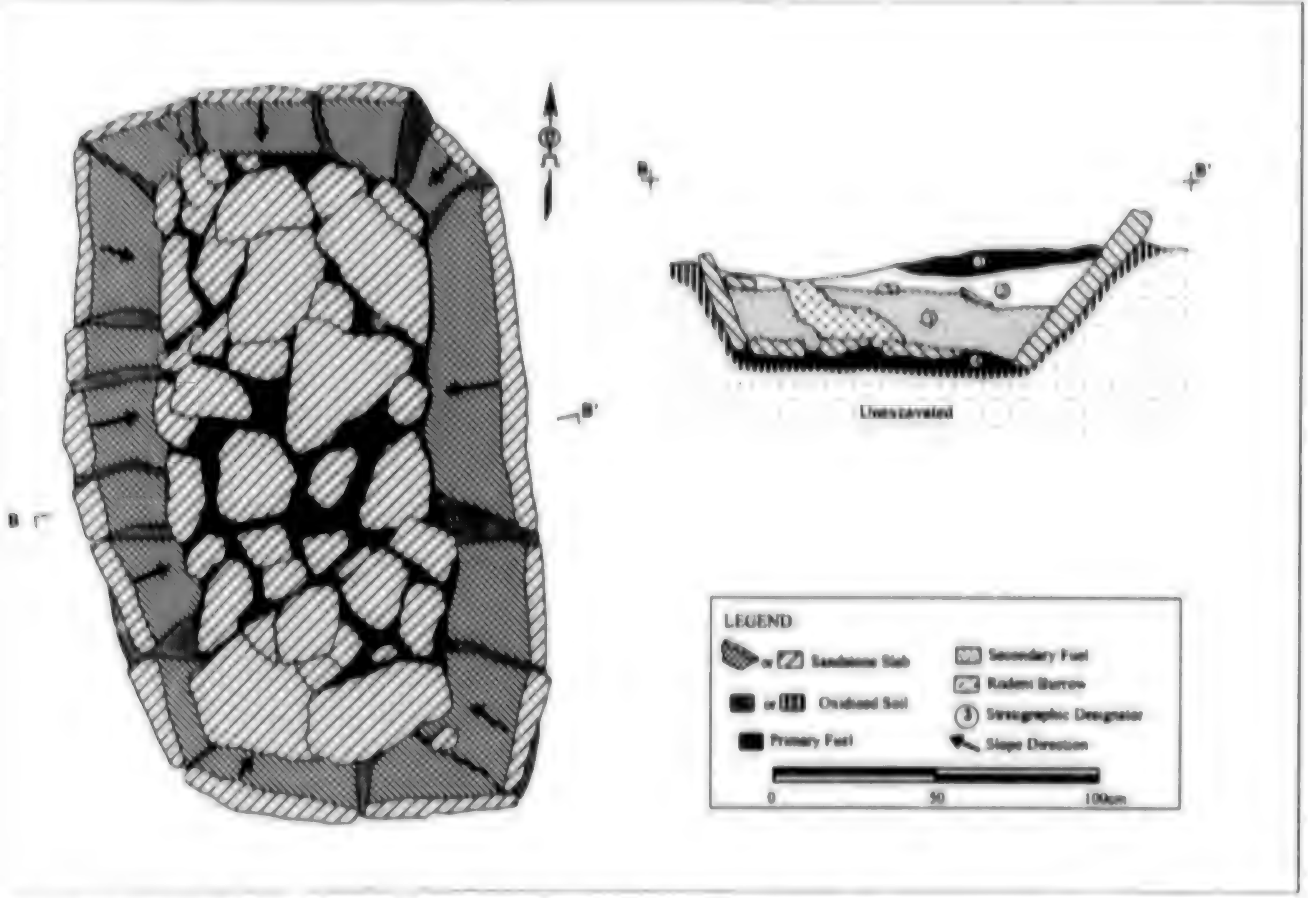


Figure 10.6. Site 5MV3899, Feature 2: plan view and stratigraphic profile.

Feature 2 also had a layer of horizontally placed blocky, angular, and tabular sandstone which rested on top of the dark organic layer which covered the floor of the kiln. There were 38 of these stones and they formed a near continuous layer across the feature. Even though this layer was not part of the initial construction it appeared to be an integral part of the kiln.

Stratigraphy of Feature 2 Site 5MV3899

There were 4 stratigraphic divisions associated with Feature 2 (Figure 10.6). Three of these were cultural layers associated with the construction and use of the feature and one was a post abandonment deposit. The lowermost deposit, Stratum 4, was a dark gray to black silty loam made up primarily of decomposing carbonized vegetal material. This stratum averaged 5 cm in depth. A layer of angular and blocky sandstone was resting on top of Stratum 4 (Figure 10.7). Stratum 3 averaged 15 cm in depth and was a brown to gray silty loam heavily mottled with charcoal bits and oxidized soil. Lying on the interface between Stratum 3 and Stratum 2 were a few pieces of oxidized tabular sandstone that appeared to be spalls from the slabs lining

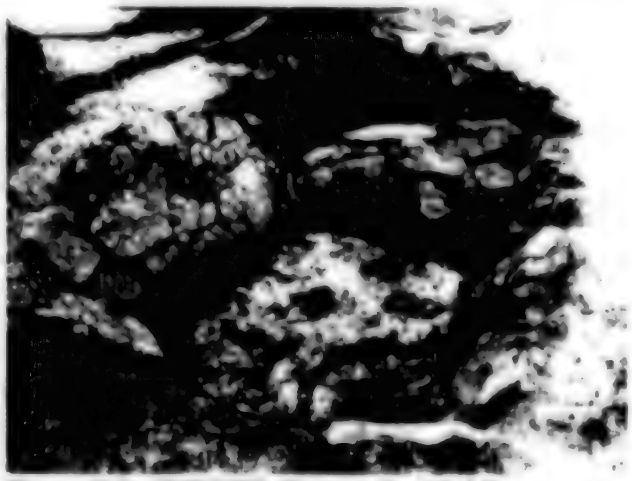


Figure 10.7. 5MV3899, Feature 2, with kiln furniture partially removed, revealing lower stratigraphy.

the walls of the feature. Stratum 2 consisted of a redeposited native soil, which was medium to light brown in color and characterized as a silty loam with a few small charcoal inclusions. Natural and human-induced erosion removed the downhill side of this stratum and exposed the tops of the vertical wall slabs. Stratum 1 represented a natural post abandonment wind and water deposit. This uppermost layer was a tan sandy loam with root inclusions. The forest duff zone capped Stratum 1. The western side of Stratum 1 had also been removed by natural and cultural erosion.

Feature 3 Site 5MV3899

Feature 3 was located 2 m to the north and west of Feature 2 and 3 m north and east of Feature 1. The feature consisted of an irregular patch of oxidized soil on the occupation surface associated with the two kiln features. Close to this burned area were a few pieces of oxidized tabular sandstone. The feature was 90 cm north to south by 55 cm east to west.

Summary of Site 5MV3899

Stylistically and stratigraphically both Feature 1 and 2 at Site 5MV3899 were examples of prehistoric pottery firing trench kilns. The oxidized patch and scatter of oxidized sandstone (Feature 3) found in association with the two kilns could be a spoil pile area created when heat fractured slabs were periodically removed and discarded.

Statigraphically both kilns had four nearly identical cultural levels. The lowermost level consisted of almost pure carbon. Lying on top of this layer there was the layer of blocky, angular, and tabular sandstone which has been interpreted as kiln furniture for supporting the ceramic vessels. Covering the sandstone layer was a layer of soil that was also heavy with charcoal fragments but was not as dark nor with as much carbon content as the lowermost layer in the kilns. This layer also had an admixture of redeposited sterile soil which appeared to be from the uppermost cultural layer of these two kilns. This uppermost layer consisted of redeposited sterile soil with a light carbon content.

Site 5MV3966

Site 5MV3966 was located further south along the waterline from 5MV3899 (Figure 10.1). This site consisted of one prehistoric pottery firing kiln (Feature 1) and one historic trash pit (Feature 2)(Figure 10.8). The trash pit was associated with the 1930s activities of the Civilian Conservation Corps (CCC) and is described in the chapter which deals with the historic aspects of the waterline project.

The prehistoric kiln was designated as Feature 1 of Site 5MV3966. Unfortunately the eastern 1/4 of Feature 1 was removed by the trencher while excavating the pipeline trench. Feature 1 differed from most of the kilns in two respects. First, datable tree-ring samples were recovered and second, stones were not present. In relation to the geography, Feature 1 was parallel to the slope and perpendicular to a shallow drainage. This kiln was situated 52 m from the cliff edge above Spruce Canyon on a west facing slope which dips toward the canyon rim at less than 5 degrees.

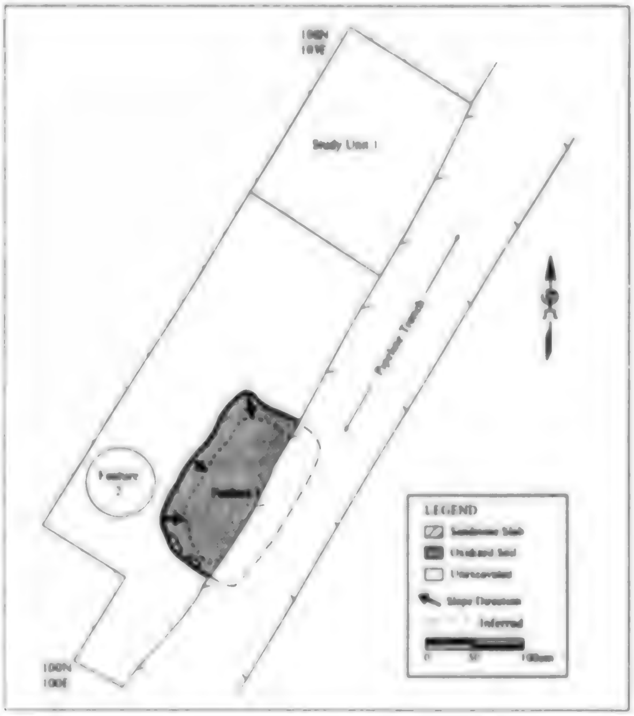


Figure 10.8. Plan view of Site 5MV3966.

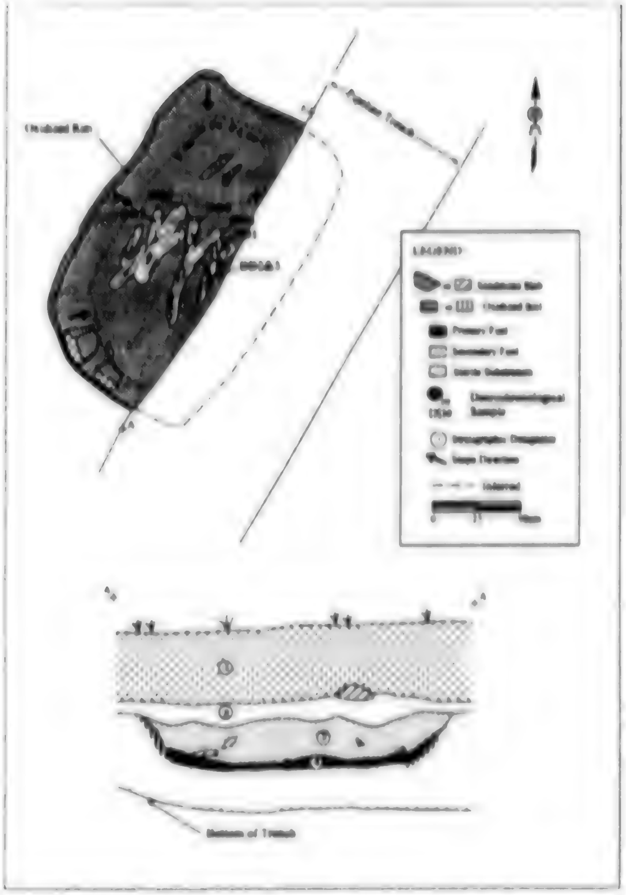


Figure 10.9. Site 5MV3966, Feature 1: plan view and stratigraphic profile.

Construction of Feature 1 Site 5MV3966

In plan view, Feature 1 at Site 5MV3966 was rectangular and the walls varied from vertical to convex (Figure 10.9). Much of the wall irregularities appeared to be attributable to rodent burrowing. The floor was fairly flat in profile but curved up near the edges to meet the base of the walls. The initial pit was dug into the Arabrab-Longburn Complex soil to a depth of 30 cm. Evidence of a block and angular sandstone layer was found in the south end of the feature. In this area there were numerous oxidized sandstone slabs which may have, at one time, been piled along the south rim of the feature. With time, these slabs may have slowly slid back into the feature. The natural silty deposits found beneath and around the stones as well as the angle at which they were lying indicates that the redeposition of the stones took place over a long period of time. There were 2 slabs remaining near the center of the south wall. It appeared that not only were most of the wall slabs removed from Feature 1 but the sandstone layer, if ever present, had also been salvaged. Oxidation of the soil behind the area where the slabs had once rested was most prevalent from just above the bottom of the walls to the rim.

Stratigraphy of Feature 1 Site 5MV3966

The stratigraphy found within Feature 1 was identical to that found in Features 1 and 2 at 5MV3899. The only appreciable difference was that this feature was highly disturbed by rodent activity and by a certain amount of tabular sandstone displacement. The deepest cultural deposit, Stratum 4, was a dark gray to black matrix consisting almost entirely of carbonized vegetal material. Much of this material was so well preserved that six dendrochronological samples were recovered. Above this rich organic stratum was Stratum 3 which averaged 25 cm in thickness. Stratum 3 contained dark gray silty loam with inclusions of charcoal and spalls of oxidized sandstone. Stratum 3 differed from Stratum 4 in that it contained less charcoal and was not stained as darkly by charcoal. Above this was Stratum 2, a redeposited layer of yellowish brown loamy clay with charcoal inclusions and bits and pieces of oxidized sandstone. Stratum 1, the final stratigraphic layer of Feature 1, was a thick lens, averaging 45 cm in thickness, of redeposited native soil as well as alluvial wash. The redeposited soil contained fragments and chunks of fractured angular bedrock and was apparently the result of historic land leveling activities.

Site 5MV3967

Feature 1 at 5MV3967 suffered the same fate as did Feature 1 at 5MV3966; that is, the trencher removed a swath along the eastern side (Figure 10.10). Spatially the two sites are only 100 m apart. Located 54 m east of Spruce Canyon in the area known as the old CCC Campground, the site consisted of the single feature which was oriented parallel to the slope and perpendicular to a small shallow drainage.

Construction of Feature 1 Site 5MV3967

Feature 1 was an unlined rectangular trench with oxidized rim and sidewalls (Figure 10.11). It was excavated into the Arabrab-Longburn Soil common along the edges of the mesa. There was a lens of horizontally placed block, angular, and tabular sandstone lying near

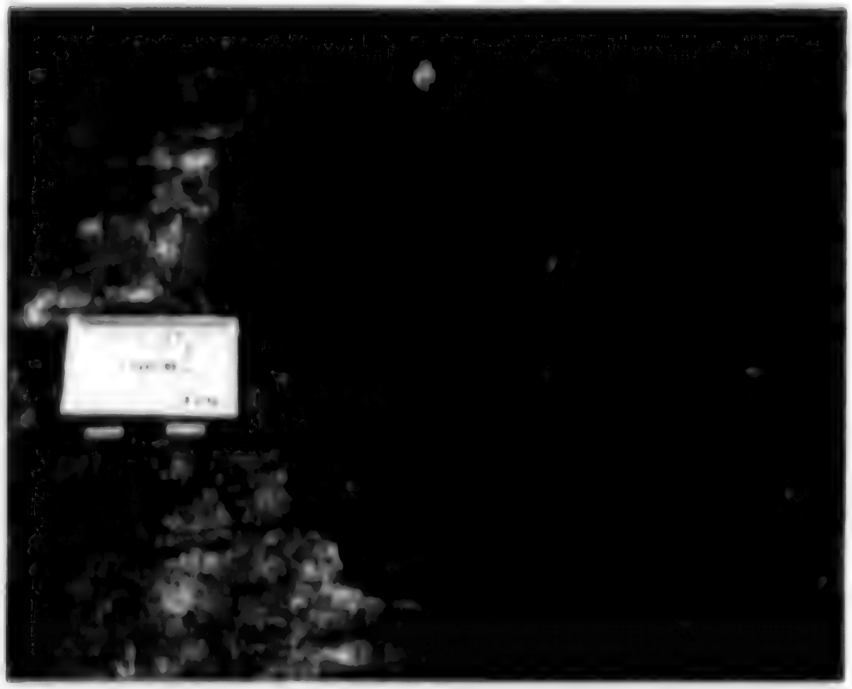


Figure 10.10. Feature 1 at Site 5MV3967, partially excavated, showing water pipeline, looking north.

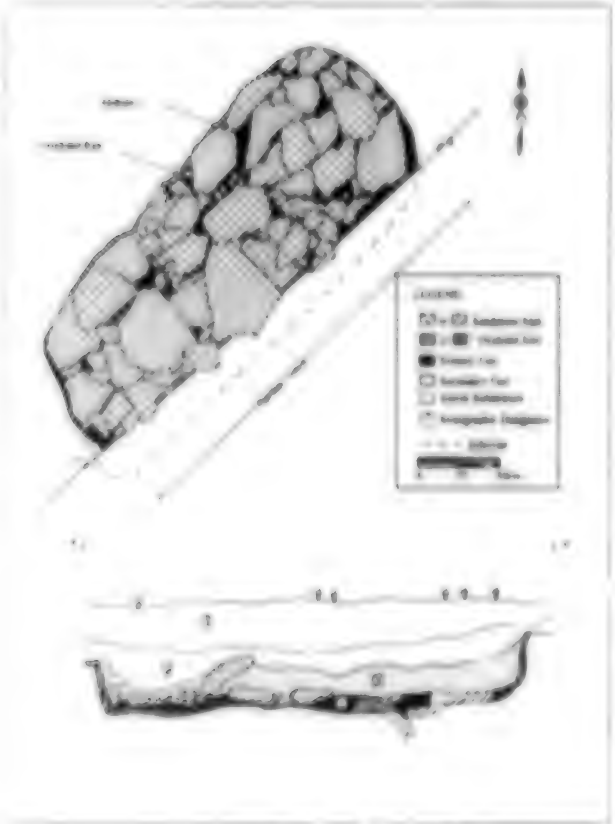


Figure 10.11. Plan view and stratigraphic profile of Feature 1 at Site 5MV3967.

the bottom of the feature. This layer of stone rested primarily on top of Stratum 5. In cross section the floor of Feature 1 was relatively flat and curved up slightly near the edges to meet the base of the walls. The most highly oxidized area with the deepest penetration was located at the rim of the feature and was 3 to 5 cm deep. The floor area had the least oxidation penetration (1 to 2 cm).There were no indications to suggest Feature 1 at Site 5MV3967 had been slab lined.

Stratigraphy of Feature 1 at Site 5MV3967

Kiln Feature 1 at Site 5MV3967, had a four strata profile similar to those kilns previously described. The lowermost stratum was Stratum 5 which was a dark gray to black, highly organic layer. A pocket of ash within Stratum 5 was designated Stratum 4. A continuous layer of highly oxidized angular, blocky, and tabular sandstone was found on top of Stratum 5. Above the sandstone, Stratum 3 was a silty dark gray loam, rich in carbonized vegetal material with numerous fragments of charcoal as well as spalls of fire cracked and oxidized sandstone. Stratum 3 averaged 17 cm in thickness whereas Stratum 5 averaged only 7 cm thick. Overlying Stratum 3 was Stratum 2, a medium brown loamy clay containing numerous bits and pieces of charcoal and a few small fragments of oxidized sandstone. Stratum I consisted of a yellowish brown loamy clay containing numerous inclusions of crushed sandstone and roots. This stratum of redeposited sterile soil and fractured bedrock was present over the entire site area and most likely formed during the 1930s when this area was first impacted by historic ground leveling activities.

Site 5MV3969

Site 5MV3969 was located south of the old CCC campground and in the middle of the 1920s Park maintenance yard. Two trench kilns made up the site and it was rather a miracle that they survived intact after all of the historic activity that had taken place in this area (Figures 10.12 and 10.13). The prehistoric topography was difficult to discern due to this disturbance. It appeared that the top of a low ridge was leveled to accommodate the maintenance yard, thus the kilns were found on what appeared to be level ground. In reality the ground outside of the disturbed areas, slopes towards the west at an angle ranging from 3 to 5 degrees. The edge of Spruce Canyon is 76 m from the kilns. It is impossible to ascertain whether or not the two features were at one time built across a drainage channel. However, the long axis of both features ran parallel to the ridge line as it was prior to historic impact. As with all the kilns, these at 5MT3969 were located in a pinyon/juniper woodland with an understory of serviceberry.

The kilns were aligned north-south, 1.2 m apart. The southernmost feature, Feature 2, was the smaller of the two (1.2 m less along the long axis than Feature 1). Both features were built into the rotted upper layer of the Cliff House Sandstone and neither was slab lined. The native sandstone facing of the features was highly oxidized in the same way as the slab linings of the other kiln features. The face of the sandstone had a thin veneer of carbon on the interior face and oxidation behind.

Feature 1 at Site 5MV3969

Feature 1 represented the larger of the two features at Site 5MV3969, it was rectangular with rounded

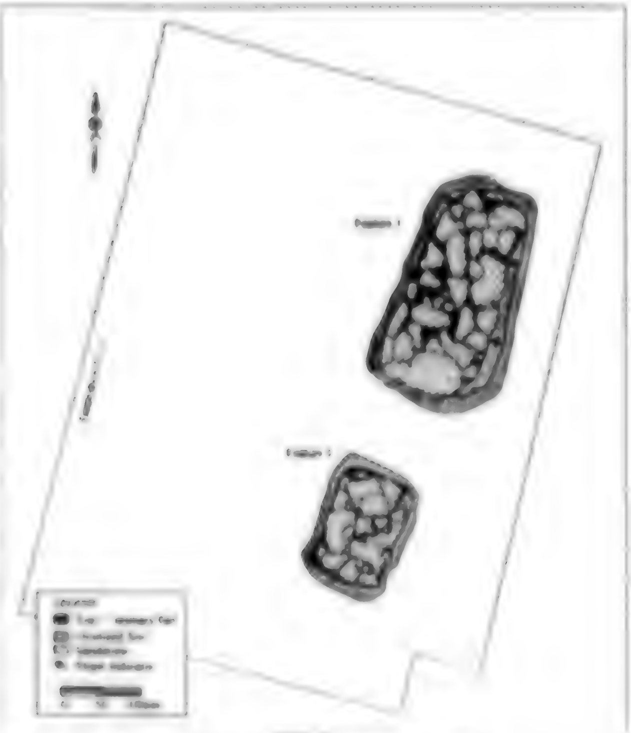


Figure 10.12. Plan map of Site 5MV3969.

Figure 10.13. Two kiln features at Site 5MV3969, looking southward.

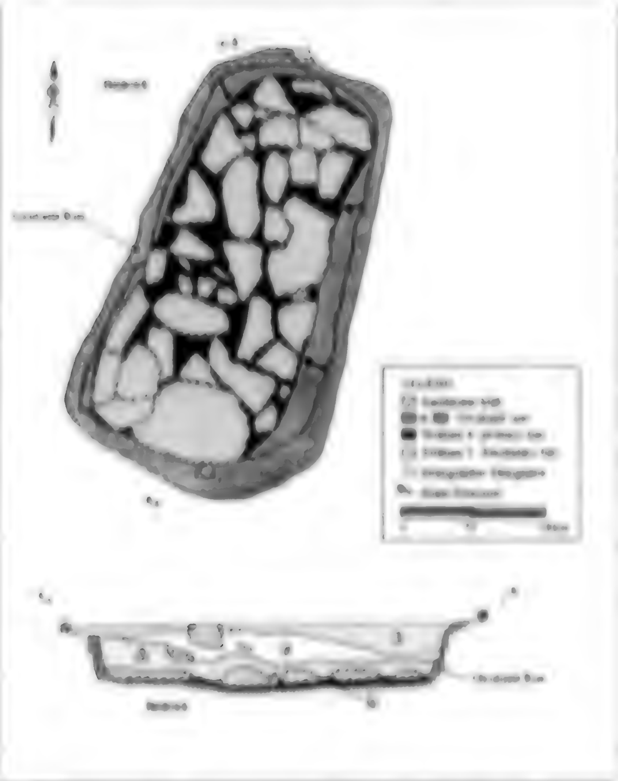


Figure 10.14. Plan view and stratigraphic profile of Feature 1 at Site 5MV3969.

corners (Figure 10.14). In profile the feature had slightly sloping, outward leaning walls with a relatively flat bottom. The floor level curved upward near the edges to meet the base of the walls.

Construction of Feature 1 at Site 5MV3969

This feature was constructed in the top of the Cliff House Sandstone Formation which is fairly soft and rotten and would have posed no great problem for excavation with primitive tools. There was no evidence that the walls of this feature had ever been lined with sandstone slabs. If such a lining had existed it was prehistorically removed. A layer of tabular sandstone resting low in the fill covered the bottom of the kiln from wall to wall.

Both the face of the bedrock within the pit and the floor of the pit were oxidized by extreme heat. Along the upper walls this oxidation had penetrated into the native bedrock from 5 to as much as 9 cm along the north wall. The floor of the feature received the least amount of oxidation penetration at 1 to 2 cm. There were a few small areas along the rim of the feature that were apparently more jagged than the builders were willing to accept. These areas were smoothed with adobe mortar filling which was thoroughly oxidized.

Stratigraphy of Feature 1 at Site 5MV3969

Feature 1 had four strata, all of which were cultural. The lowermost was Stratum 4, a thin (3 cm) lens of almost pure carbon. On top of this stratum there was a tightly packed lens consisting of 43 pieces of oxidized angular, blocky, tabular sandstone. The largest of these took up a good share of the south end of the kiln and was actually in contact with the floor of the kiln. Stratum 3 was a dark gray silty loam containing a high percentage of charcoal fragments as well as some oxidized sandstone spalls. Above this, Stratum 2, was a yellowish tan silty loam interspersed with charcoal fragments and some sandstone fragments. The interface between Strata 2 and 3 was not smoothly defined and appeared to have been disturbed. The sandstone content of Stratum 3 was higher than in other kilns and the pieces were generally larger. Stratum 2 was covered by a prehistoric cultural deposit, Stratum 1, which indicated that the disturbance between Strata 2 and 3 took place prehistorically. The dark brown silty loam of Stratum 1 covered the entire kiln and extended outward far enough to encompass Feature 2 as well. This clay loam contained charcoal fragments as well as fragments of oxidized sandstone. The contents of this Stratum 1 may indicate that at the time of abandonment there was a pile or piles of earth impregnated by charcoal and sandstone which were close to the two kilns. Through time, natural processes of wind and water redeposited much of this soil and effectively buried both kilns. Another possible scenario is that there are other kilns in the area that post date Features 1 and 2 and that unwanted spoil dirt from one or more of these was deposited on top of Features 1 and 2.

Feature 2 Site 5MV3969

Feature 2 at Site 5MV3969 was almost identical to Feature 1 except for being of a smaller size. In plan view, the feature was rectangular and in profile rectilinear (Figure 10.15). The walls of the pit were not vertical but sloped outward, anywhere from 5 to 15 degrees.

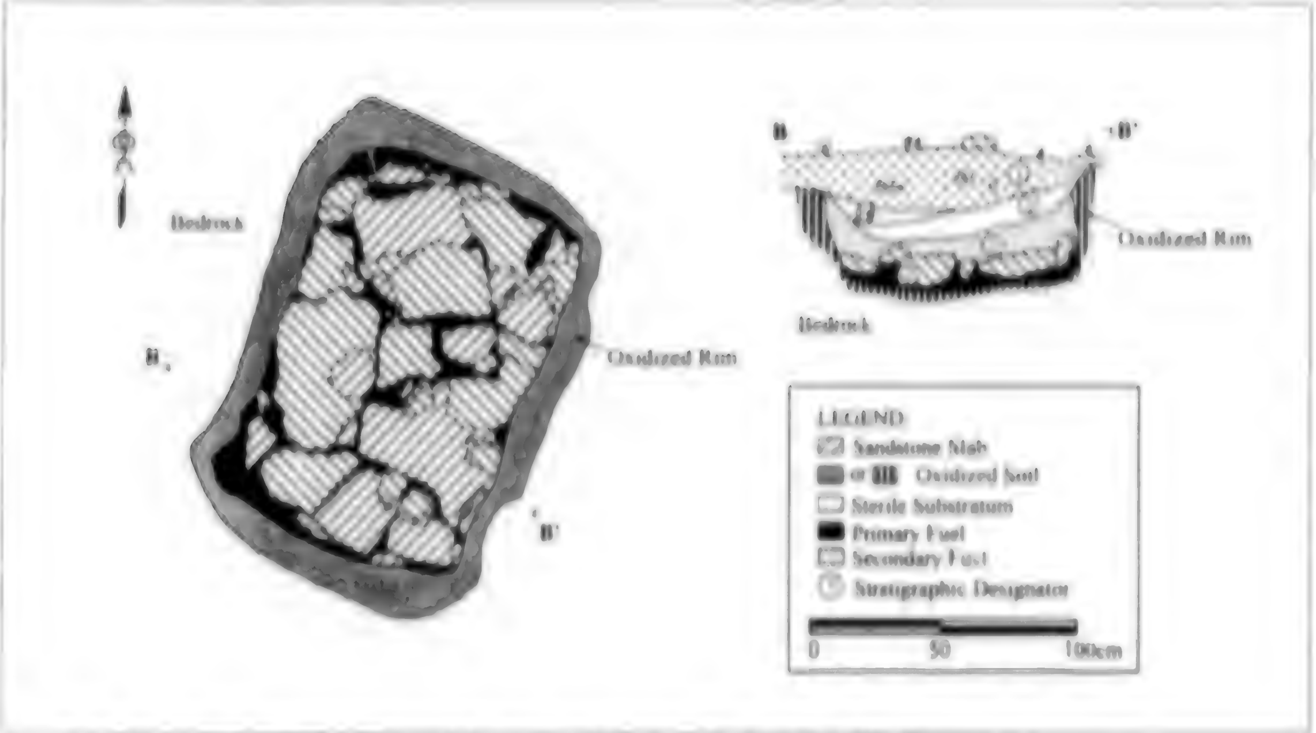


Figure 10.15. Plan view and stratigraphic profile of Feature 2 at Site 5MV3969.

Construction of Feature 2 at Site 5MV3969

This feature was also cut into bedrock and was not slab lined around its sides. Perhaps the bedrock itself served the same purpose as a slab lining and was not necessary for Features 1 and 2. As with Feature 1, Feature 2 had a horizontal lens of 42 tightly packed pieces of angular, blocky, and tabular sandstone. This is almost the exact number of stones found in Feature 1. The difference in Feature 2 is that the stones were larger overall with the largest measuring 55 by 40 cm. The oxidation along the exposed bedrock face was also similar to Feature 1. The upper walls were oxidized to a depth ranging from 8 to 10 cm and the floor from 1 to 4 cm.

Stratigraphy of Feature 2 at Site 5MV3969

The stratigraphy of Feature 2 consisted of the same type of strata as previously described for Feature 1. The only difference was that the upper strata in this kiln had not been prehistorically disturbed. Stratum 4 was the organically rich layer found directly on the floor of the kiln. Above this, Stratum 3 was a grayish silty loam with a high content of charcoal and ash but not as much as Stratum 4. Stratum 2 was a yellowish tan silty loam containing charcoal bits. Stratum 1 was the same dark brown silty loam that covered both Features 1 and 2 and the immediate site area around the two.

Site 5MV3972

Site 5MV3972 represented the largest of the nine kilns excavated during the Mesa Verde Waterline Replacement Project (Figure 10.16, also see frontispiece for photograph of this kiln). This kiln was used as the model for a successful replica pottery firing of 116 individual vessels during the 67th Annual Pecos Conference in 1994. Site 5MV3972 was located at an elevation of 2133 m (7000 ft) on a southeast facing slope which drains into a small side branch of Spruce Canyon 76 m away. The large well preserved remains of Spruce Tree House are found at the head of this small side branch only a short walk away from this feature.

Site 5MV3972 was found in the same pinyon/juniper woodland environment as the kilns at 5MV3969. In fact the two sites are less than 200 m apart. The kiln at 5MV3972 was parallel to the slope and was situated across a small, shallow drainage. Three additional features were associated with the kiln all of which

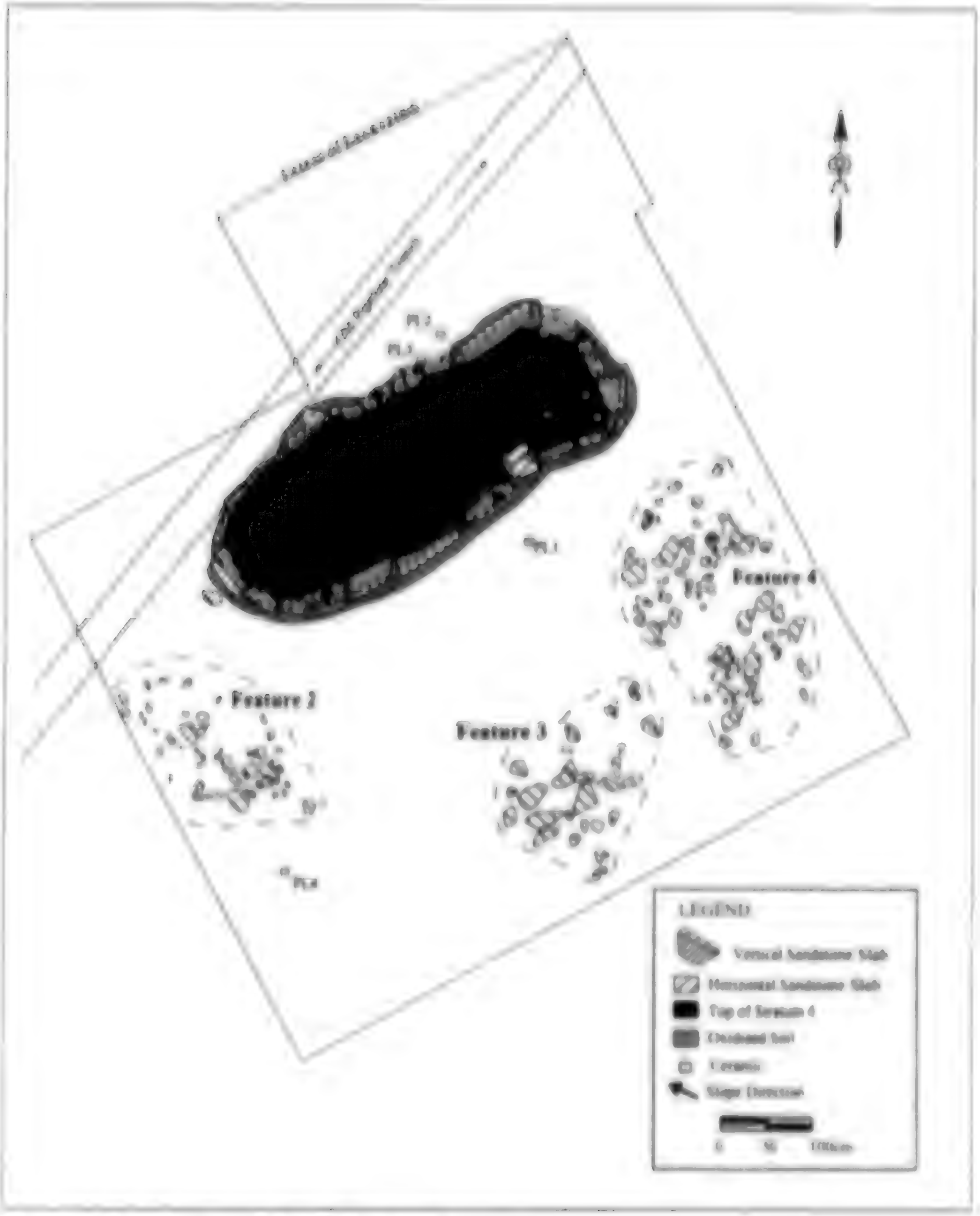


Figure 10.16. Plan map of Site 5MV3972.

appeared to be spoil piles resulting from the periodic cleaning of the kiln.

Construction of Feature 1, Site 5MV3972

The plan view of the 4.45 m long Feature 1 at Site 5MV3972 resembled a boot track (Figure 10.17). In profile the slab lined walls leaned outward and the floor appeared to be reasonably flat. Because this feature was slated for future interpretive display, the internal layer of blocky and angular sandstone was not removed in all areas to fully expose the floor. However, certain areas were excavated along the long axis of the feature where no kiln furniture was present in an effort to determine the nature of the floor as well as to determine the average thickness of the stratum underlying the sandstone layer.

The kiln was excavated into the Arabrab-Longburn soils that are common in canyon rim localities. The excavated trench walls were then lined using 24 pieces of tabular sandstone. These were the only materials used in the construction of this kiln. The lining slabs were fitted into place but not mortared. A layer of horizontally oriented block and angular pieces of sandstone had been placed near the bottom of the kiln. This lens of stone rested in and on top of the lowermost stratigraphic layer of the kiln but not on the floor. The side walls (behind the slabs), the rim, and to a lesser degree the floor of the kiln were all oxidized. The depth could not be ascertained without damage to the original fabric.

Stratigraphy of Feature 1 Site 5MV3972

There were seven strata assigned to Feature 1 at Site 5MV3972 in the field. In the laboratory Strata 1A, 1B, and 1C were collapsed into a single stratum and Strata 2 and 3 were determined to be lenses of a single stratum and redesignated Stratum 2. With the reevaluation there were four strata recognized, Strata 1 through 4 with Stratum 4 the lowest and Stratum 1, the uppermost.

Stratum 4 was a layer which consisted almost entirely of carbonized vegetal matter and ash. Decomposing charcoal stained the layer a dark gray to black within a matrix of silty loam earth. The lens of blocky, angular, and tabular sandstone slabs was placed on top of this stratum and as the result of soil pressure these stones, near the center of the feature, settled into Stratum 4. Stratum 3 (field Strata 2 and 3) was a light tan silty loam containing quantities of both ash and charcoal intermixed with some spalls of oxidized tabular sandstone. Most of these spalls were found on the interface between Stratum 3 and 4. Stratum 2 was a layer of redeposited sterile soil. Stratum 1 (field strata 1A, 1B, and 1C) was a post abandonment strata. Lens 1A consisted of construction debris from an old water line trench which ran from northwest to the southeast

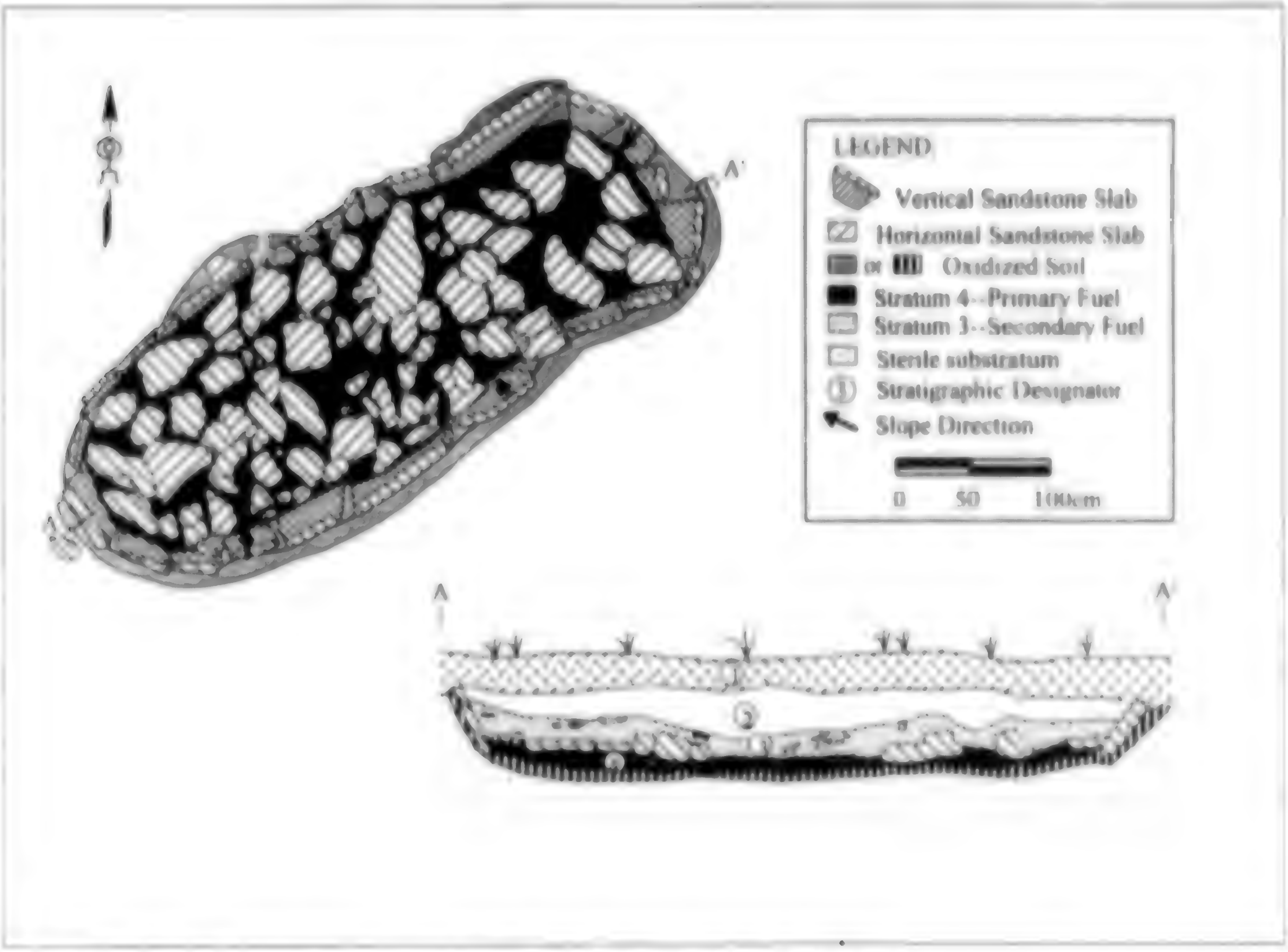


Figure 10.17. Plan view and stratigraphic profile of Feature 1 at Site 5MV3972.

and just clipped the southwestern corner of the kiln. Lenses 1B and 1C were, for the most part, colluvial slope wash which contained bits and pieces of unmodified bed rock.

Features 2, 3 and 4 at Site 5MV3972

Features 2, 3, and 4 at Site 5MV3972 were somewhat scattered concentrations of broken oxidized sandstone intermixed with charcoal fragments. All three features were located downhill from Feature 1 but in close proximity. There was a single Mancos Black-on-white jar sherd in association with Feature 2. No other ceramics were found with either of the other two spoil piles. Feature 2 measured 2.4 m in length by 1.4 m in width. Feature 3 was 2 m long by 1.45 m wide and Feature 4 was 3 m by 1.7 m. Each of the discard pile features was cross sectioned to determine if any sort of layering or stratigraphy could be discerned. The stratigraphy indicated that the stones were at one time more neatly stacked than they were at the time of excavation and that natural agents toppled the piles into the scattered condition apparent on the plan map.

Site 5MV3945, The Library Site

Site 5MV3945 is referred to as the library site because of its location directly behind the Mesa Verde National Park Research Library. This site was impacted in 1990 by heavy equipment involved in the rehabilitation of Building 9 (the Library). At that time the kiln was partially excavated by the Park archeologist, Jack Smith. During the Mesa Verde Waterline Replacement Project the waterline crew completed the excavation and documentation.

Site 5MV3945 was located at 2205 m (6940 ft) elevation approximately 350 m southwest of site 5MV3972 with the same southeasterly aspect. Both 5MV3972 and 5MV3945 contained Mancos Black-on-white pottery and Site 5MV3945 was even closer to Spruce Tree House than was site 5MV3972.

Site 5MV3945 consisted of a single slab lined kiln which was oriented parallel to the slope. Historic modification in this area precludes any determination of whether or not the feature was or was not situated in any type of drainage. The slope faces due east and slopes down at a 5 to 7 degree angle to the edge of the canyon 60 m away.

Construction of Feature 1 Site 5MV3945

Feature 1 at Site 5MV3945, in plan view, appears somewhere between rectangular and oval. In profile the slab lined walls sloped outward away from the vertical (Figure 10.18). The degree of this outward slope ranged from 8 degrees to as great as 30 degrees along the north wall. There were fourteen pieces of tabular sandstone used to line the walls of Feature 1. One of these slabs was removed by the Mesa Verde Waterline Construction project backhoe which had originally impacted the feature. There was a layer of blocky, angular, and tabular sandstone slabs resting just above the floor of the kiln on top of the lowermost stratum of carbonized organics. The pit for the kiln had been dug into the Arabrab-Longburn, mesa edge type soil, until bedrock was reached at 55 cm. The top of this caprock formed the floor of Feature 1. The oxidized area around the rim of Feature 1 extended out from the edge of the kiln as much as 12 cm.

Stratigraphy of Feature 1 Site 5MV3945

Feature 1 at Site 5MV3945 contained four strata similar to that found in the kilns already described. Three of these were interpreted as cultural deposits and the fourth appeared to be natural post abandonment alluvium with an admixture of historic redeposition. The lowermost stratum (Stratum 4) lying directly on the floor consisted of almost pure carbonized vegetal matter and averaged 18 cm in depth. A layer of blocky and angular sandstone slabs covered the entire floor area. Stratum 3, above and around the tabular sandstone slabs was a yellowish silty loam heavily impregnated with charcoal bits and fragments as well as spalls of oxidized sandstone. Between the decomposition of the ash and charcoal this stratum was only slightly less dark in color than Stratum 4. Stratum 2 consisted of fairly clean redeposited sterile soil. This soil was a yellowish brown silty loam residuum which contained small angular fragments of decomposed bedrock. Stratum 1 was a post abandonment/historic disturbance deposit. The sterile yellow residuum brought up by the backhoe, before it impacted the north end of the kiln, was dumped on top of the natural horizon above and around the kiln.

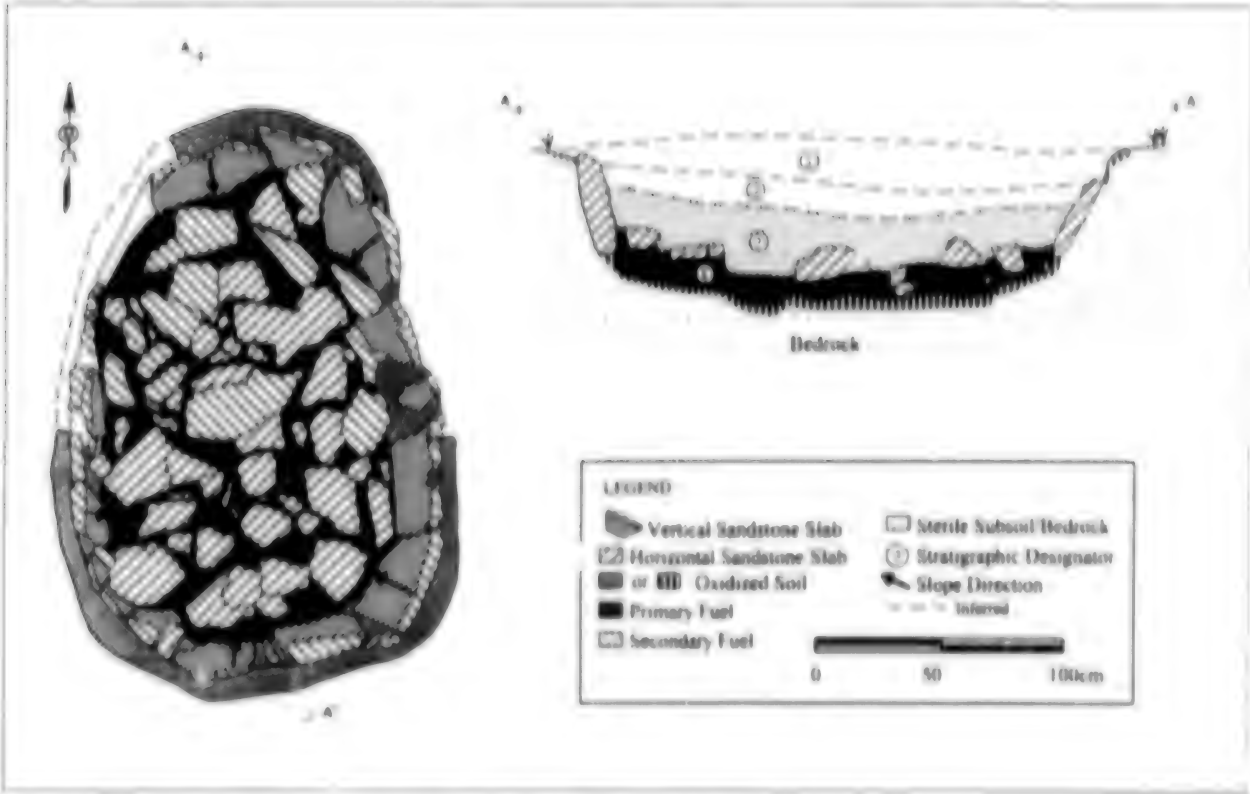


Figure 10.18. Plan View and Stratigraphic Profile of Feature 1 at Site 5MV3945.

Site 5MV3982, Jack Mueller Kiln

Site 5MV3982 is referred to as the Jack Mueller Kiln since it was located next to what was his residence when he served as the Park's executive officer. This site sits on a southeast facing slope 90 m above the edge of the tributary to Spruce Canyon where Spruce Tree House is located. Not surprisingly the feature was oriented parallel to the ridge and across a small drainage. The slope from the kiln to the canyon edge ranges from 5 to 7 degrees. The kiln was within a pinyon/juniper woodland at an elevation of 2097 m (6880 ft). The pipeline trench destroyed the northwest corner of this feature but most of it was intact. At some point during the use of this feature a wall, consisting of four large pieces of blocky sandstone, was so placed that the length of the kiln was reduced by 36 cm.

Construction of Feature 1 Site 5MV3982

Feature 1 at Site 5MV3982 was built partly against a low bedrock shelf. This natural outcrop formed the northwest corner of the kiln. A pit formed the walls for the rest of the feature and these earthen walls appeared to have been unlined. However, the slabs used when the feature was remodeled may have originally been the lining and were simply reused. Feature 1 was rectangular in plan view and as originally dug was 40 cm deep (Figure 10.19). The floor was relatively flat except along the edges where it curved upward to meet the base of the walls. The walls in most areas were almost vertical near their lower margins but flared outward near the top. The soil around the upper margins of the kiln was highly oxidized but the lower walls and the floor had very little oxidation. Behind the new slabs and extending to the original walls was a layer of redeposited soil (Stratum 7).

Stratigraphy of Feature 1 Site 5MV3982

There were seven stratigraphic divisions defined for Feature 1. Strata 1, 2, and 4 were natural and the four other strata were interpreted as cultural. Strata 3, 5, and 6 were the three strata typical of the Chapin Mesa kilns. Stratum 6 was the lowermost black organically rich lens found on the floor of all kilns thus far described. Typically the blocky, angular, and tabular sandstone slabs were placed on top of this stratum and in turn they were covered by Stratum 5 which appeared as a charcoal rich grayish loam containing numerous bits and pieces of charcoal and fragments of oxidized sandstone spalls. Finally Stratum 3 was a layer of redeposited sterile soil. Stratum 4 proved to be a rodent disturbance which intermixed some of Stratum 3 with Stratum 5. Stratum 7 was the soil placed behind the slab lining when the feature was remodeled. Stratum 7 was a mottled yellowish clay loam interspersed with bits and pieces of charcoal, oxidized soil, and small pieces of oxidized sandstone. This stratum was very much like Stratum 3 and could very possibly have been some of Stratum 3 that was used as filler behind the slabs at the time of remodeling. The "remodelers" evidently removed most of the old fill from the south end of the kiln, which included all of Stratum 3, 5, and part of Stratum 6. The backing fill, Stratum 7, was then placed in the cleared area up to the depth of the bases of the slabs, at which time the slabs were set into place. Once the slabs were set the rest of the area between the backs of the slabs and the original walls was filled with Stratum 7.

Summary of the Chapin Mesa Kiln Sites Construction and Stratigraphy

The similarities of construction and stratigraphy are unmistakable in all of the Chapin Mesa Kiln features. Of the nine kilns, seven were slab lined and the two that were not had been excavated into bedrock. Two of the features had enough physical evidence left behind to indicate the former presence of a slab lining. Slabs were not mortared in place in any of the kilns. All but one of the kilns contained a horizontal layer of blocky, angular, and tabular sandstone slabs which appeared to have been intentionally placed on top of the lowermost stratum of fill. The one exception was Feature 1 at 5MV3966 which had apparently been thoroughly robbed of its construction material prehistorically.

Features 2, 3, and 4 at Site 5MV3972 were scattered concentrations of broken oxidized sandstone intermixed with charcoal fragments. These features may have been formed when kilns were refurbished. Because the lining slabs encircling the kiln and the kiln furniture would be expected to crack from the intense heat after multiple firings, they eventually would need to be replaced.

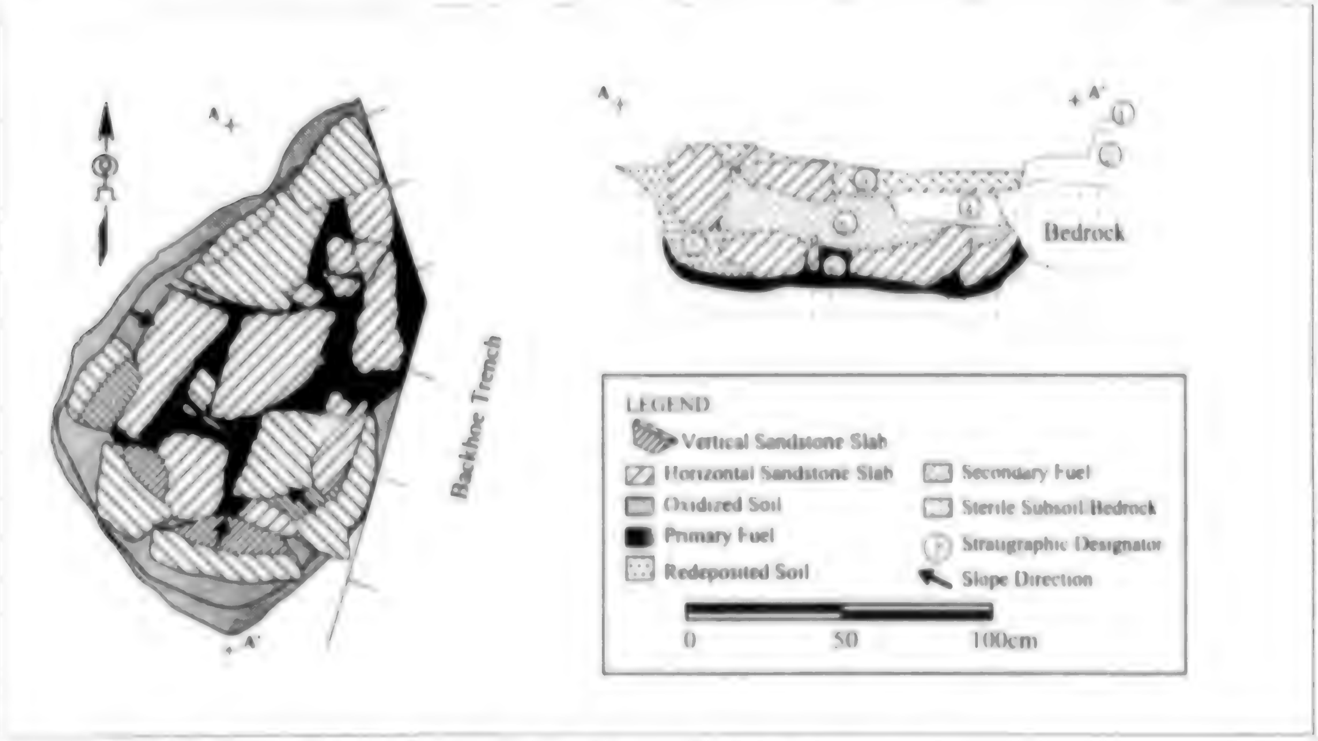


Figure 10.19. Plan View and Stratigraphic Profile of Feature 1 at Site 5MV3982.

The more angular and blocky sandstone slabs found inside the kiln were probably more prone to fracturing and generally had a bright red color throughout. In contrast, the kiln lining slabs color ranged from bright red to orange and yellow. Features 2, 3, and 4 at Site 5MV3972 probably represent the areas where discarded stones from kiln refurbishing were placed.

Oxidation was a central theme in all kilns. The walls and floors of the features were oxidized and the native soil immediately around the rims was also oxidized. Oxidation on the floor was usually to a depth of 3 to 5 cm. The one exception was in Site 3967 where the floor oxidation was thin (1-2 cm). A probable cause for the oxidation pattern may tie into the firing regime itself. Once the initial fuel load had been consumed and the residue deposited on the bottom of the kiln it may never have been removed again throughout subsequent firings. This layer of partially consumed fuel would remain and new fuel would simply be added during each firing reigniting the original fuel layer. The undisturbed continuous layer of ash and charcoal lying on the floor would seal the floor from oxygen which would suppress oxidation there in contrast to the upper walls which were exposed to the open air during each firing.

Stratigraphically the cultural fill within the kilns was virtually identical. The lowermost stratum consisted of almost pure carbon that had not been totally consumed. This stratum was probably formed by the breakdown of organic material that had not been totally consumed during the last firing of this feature. This charcoal lens averaged 10 cm in most kilns but was only 3 cm thick in Site 5MV3969.

Lying on top of this layer was the lens of horizontally placed blocky, angular, and tabular sandstone slabs interpreted as kiln furniture. The placement of these slabs would have been the factor that halted the main flow of oxygen to the fuel beneath preventing total consumption. A stratum of charcoal rich ashy soil appeared above and intermixed with sandstone slabs. This stratum was similar to the lowermost stratum but contained less and smaller pieces of charcoal as well as pieces of oxidized sandstone spalls. These spalls seem to have originated from the slabs lining the walls and were probably detached by the extreme heat of repeated firings of the kiln.

The final cultural stratum consisted of redeposited sterile soil which had probably been used to smother the firing. Especially at Site 5MV3967, this stratum appears to have been a deliberate placement and was probably used to seal the kiln and its contents. This stratum also contained bits and pieces of charcoal as well as a few smaller spalls of oxidized sandstone. This mixture may have occurred as the potters dug down through the smothering layer to retrieve their fired vessels.

The following sections will deal with temporal placement, material culture, and fuel preferences in the Mesa Verde kilns. The time period, material culture, and fuel preference was similar in all the kilns.

Temporal Placement of the Chapin Mesa Kilns

All of the kilns, temporally, fall into an early to late Pueblo II time frame ca. 900-1100 A.D. This assessment was based on tree-ring dates as well as ceramic typological cross dating. Only seven of the nine kilns contained ceramic material with a combined total of 486 sherds (Figure 10.20). The major ceramic analysis of this material was performed by Dean Wilson and Eric Blinman of the Museum of New Mexico, Office of Archaeological Studies, (Wilson and Blinman 1993a). An additional 27 sherds recovered in the bulk soil samples were analyzed by Patricia Flint of Flint Research Associates Cortez, Colorado (Flint 1994). The following discussion is derived from both of these analyses (Table 10.2).

Ceramic Dating of Kiln Sites

Ceramic type distributions were used to estimate dates of feature use. Date estimates were based on the calibration of changes in pottery type occurrences and abundance in the Mesa Verde region as a whole (Wilson and Blinman 1993b). The precision of such date estimates is dependent on the quality and size of target archeological collections. The small size of the ceramic assemblage recovered from sites investigated by this project limited the level of dating resolution. Also ceramics found in the fill of kilns only date the last use of the feature or the use of the landscape surrounding the features.

All of the features containing ceramics excavated during the Mesa Verde Waterline Project appear to have been last used during the Pueblo II period. The dominance of Cortez Black-on-white in association with Mancos Black-on-white, Mancos Corrugated, and Plain Gray at site 5MV3899, indicates this feature was last used late in the early Pueblo II period (A.D. 950 to 1025). The presence of Mancos Black-on-white as the dominant white ware type sometimes in association with corrugated jar sherds of Mancos Corrugated and Dolores Corrugated indicates a late Pueblo II date (A.D. 1025 to 1100) at several features, including sites 5MV3945, 5MV3969 and, 5MV3972. The lack of diagnostic types at 5MV3967 makes precise date assignments impossible; the presence of corrugated sherds indicates only that it dates after A.D. 900. Most if not all of these features were last used during the 10th or 11th century. These are the first excavated kilns known to date to this period.

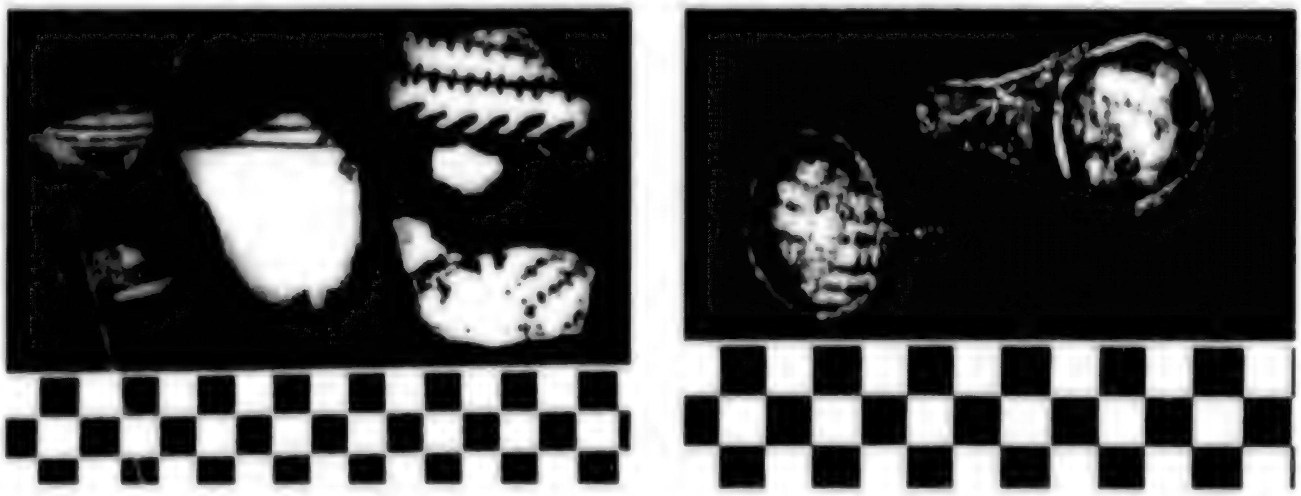
Tree-ring Dating of Chapin Mesa Kilns

Six tree-ring samples from Site 5MV3966 were dated to the A.D. 900s. Samples were taken from only one other kiln (5MV3945) and were not datable. Although none of the dates from 5MV3966 are cutting dates, the final date of A.D. 960 is a bark date and is probably missing less than 5 rings. The other dates were A.D. 933++vv, 938vv, 948++vv, 953vv, and 957+vv. These dates, of course, are from dead wood and do not

Table 10.2. Ceramic Pottery Types Recovered from Kilns on Chapin Mesa

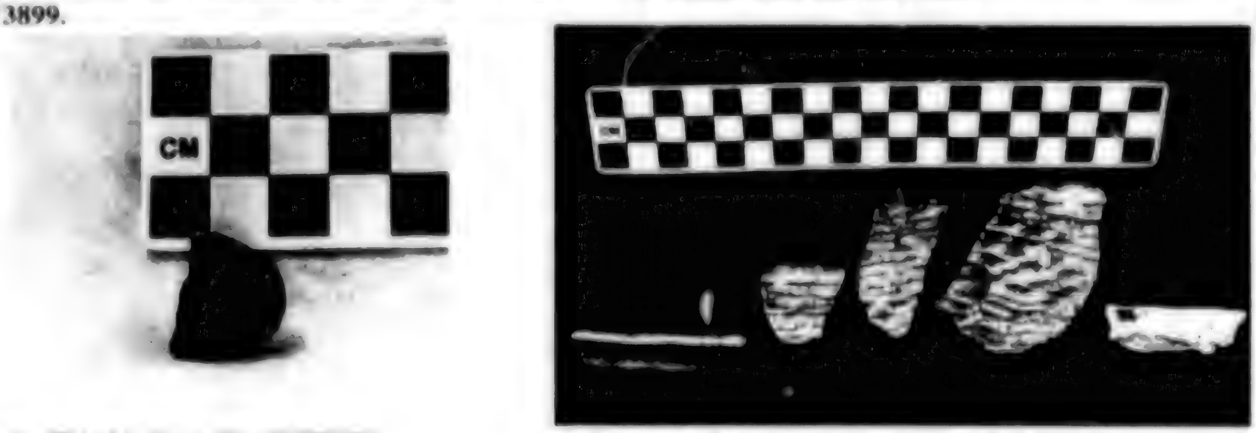
	5MV 3899	5MV 3945	5MV 3967	5MV 3969	5MV 3971	5MV 3972	5MV 3982	Total
Pottery Type	N	N	N	N	N	N	N	N
Indeterminate	45		1	16				62
Indeterminate Gray	7					1		8
Chapin Gray	1			1				2
Mancos Gray				4		2		6
Mancos Corrugated	1							1
Dolores Corrugated						1		1
Plain Gray	5		4	1		1		11
Corrugated Gray		3	1		4	2		10
Cortez B/W	34	1						35
Mancos B/W	10	8		1	3	10		32
Mancos B/W (Dogoszhi)	3	2				3		8
PI or PII B/W	21				1	10		32
PII or PIII B/W	1				1	1	1	4
Polished B/W	214	1		9		10		234
Unpolished B/W						24		24
Unpolished White	14							14
Indeterminate Red	2							2
Total	358	15	6	32	9	65	1	486

a. Cortez Black-on-white bowl from Site 5MV3899.



b. Cortez Black-on-white sherds from vessel #8 at Site 5MV3899.

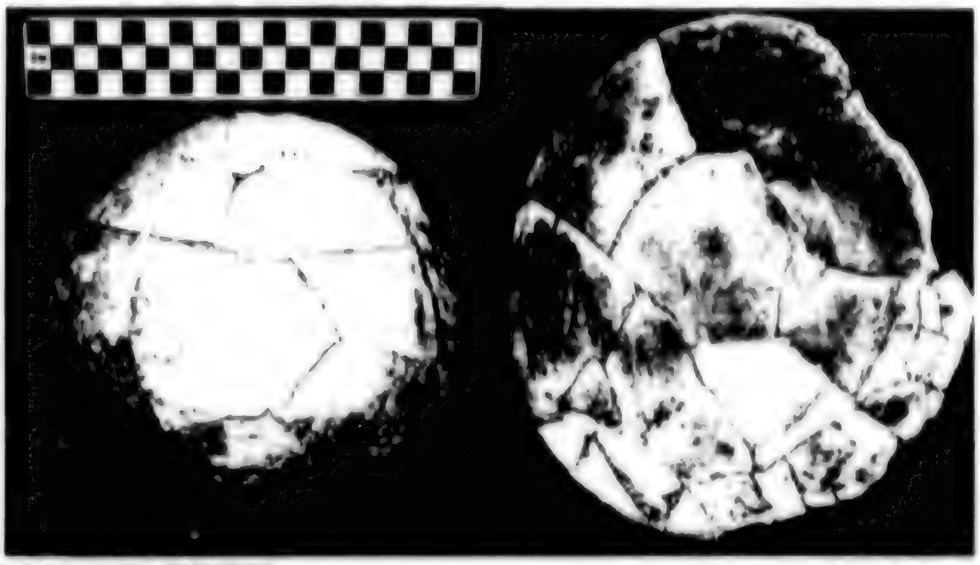
c. Ladles from Site 5MV3899.



d. Thimble from Site 5MV3969.

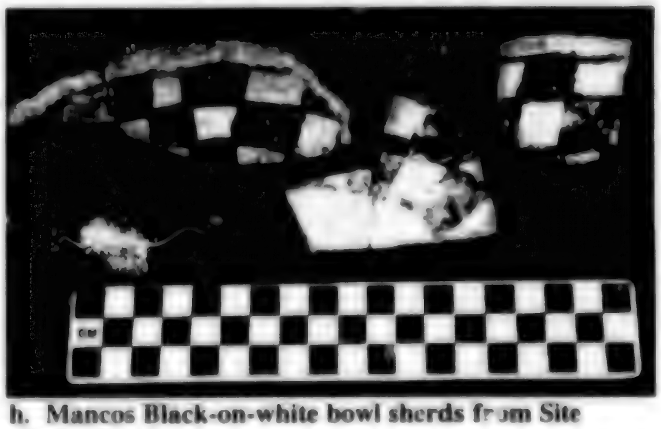
e. Corrugated jar sherds from Site 5MV3972

Figure 10.20. Sample of ceramics recovered from kilns excavated on Chapin Mesa.

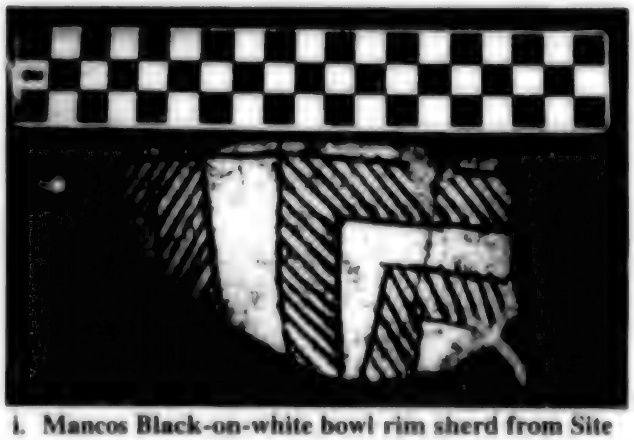


f. Puki from Site 5MV3972.

g. Ladle from Site 5MV3945.



h. Mancos Black-on-white bowl sherds from Site 5MV3945.



i. Mancos Black-on-white bowl rim sherd from Site 5MV3945.

give us the date of the actual year the wood was used as fuel. The bark date, A.D. 960++B is from pinyon pine and was thought by the laboratory to be missing less than 5 rings placing the date at A.D. 965. Dead pinyon pine ceases to be an excellent fuel source after it has been exposed to the elements for over five years. Using this rule of thumb, five additional years were added to the A.D. 965 date assigned by the tree-ring lab. If these estimates are somewhat correct, Feature 1 at site 5MV3966 was last used about A.D. 970.

Archaeomagnetic Sampling Results

The results of the archaeomagnetic dating were disappointing. Archaeomagnetic samples were collected from 5MV3969 Features 1 and 2, and Site 5MV3967 Feature 1. The results of these samples were, in the words of the analyst, not good enough to warrant further treatment of the samples (Eighmy 1993). The scatter in specimen directions was enormous. Typical archaeomagnetic samples will have alpha 95 values in the range of 2.5 to 3.5 degrees. The values from the three kilns tested were ten times that size. The two kilns from site 5MV3969 were both excavated into the underlying sandstone bedrock, and even though it was well oxidized, sandstone often does not have enough clay in it to cement the magnetic grains into place for hundreds of years. The single kiln at 5MV3967 was dug into soil but apparently the clay content was iron poor, thus, no date could be determined.

Summary of Temporal Placement of Chapin Mesa Kilns

By using ceramic typological cross dating and tree-ring dates, a tentative time frame can be assigned to eight of the nine kilns excavated on Chapin Mesa. Site 5MV3899 Feature 2 has a ceramic date of A.D. 950 to 1025. By no other means than proximity, Feature 1 was probably used at the same time although the proximity may or may not indicate contemporaneity. Site 5MV3966 contained no artifactual material but six tree-ring dates were recovered from this feature. Analysis of all of the dates suggests that this feature was last used around A.D. 970. Site 5MV3967 based on ceramic typological cross dating was last used at some point after A.D. 950. Again based solely on ceramic dating sites 5MV3969, 5MV3972, and 5MV3945 were all last used between A.D. 1025 and 1100. The only site that remains totally undatable by any means available was the kiln at 5MV3982. With the exception of this site it can be stated with a great deal of certainty that all of the pottery firing features were last used during the Pueblo II period prior to A.D. 1100.

It does not appear that the Late Pueblo III residents of Spruce Tree House utilized the kiln at Site 5MV3972. From the tree-ring series recovered from Spruce Tree House, there were only three samples that dated to a time contemporaneous with 5MV3972. However, all of these dates were non cutting dates (A.D. 1045vv, A.D. 1055vv,and A.D. 1069vv). The pottery type recovered from the kiln Site 5MV3972 was Mancos Black-on-White which was manufactured from A.D.1000 to A.D.1150. The tree-ring dates and the ceramic dates are, at best, a weak link between the kiln and a possible Pueblo II occupation of Spruce Tree House.

Ceramic Material Culture Assemblage Characteristics at Chapin Mesa Kilns

The ceramic assemblage of 486 sherds was relatively small and characterized predominantly by whiteware with mineral paint which was heavily sooted, spalled, oxidized, or warped. Sherds appeared to have been exposed to a wide range of firing conditions even if they had originally been from the same vessel. The condition of the sherds indicated many were pieces not removed after the last firing or sherds which had been used as cover sherds. There were also some whole miniature vessels (Table 10.3, Figure 10.20). The "dominance of whiteware sherds suggests that these kilns represent specialized features employed to consistently achieve the higher temperatures and neutral atmospheres necessary to produce hard vessels with white surfaces decorated in black pigment" (Wilson and Blinman 1993: 9).

Site 5MV3899 had the most sherds (358) and many of the whiteware sherds could be attributed to one of 7 vessels. There were 2 unbroken miniature ladles (Vessels 1 and 2), a Cortez Black-on-white olla (Vessel 3), a Pueblo I-Pueblo II Black-on-white jar (Vessel 4), a whiteware jar (Vessel 6), 2 Cortez Black-on-white bowls (Vessels 7 and 8).

Site 5MV3969 contained 32 sherds of which some were from two identifiable vessels: a single unbroken thimble bowl and a neck of a clapboard corrugated jar. Site 5MV3972 contained 65 sherds from which five vessels were identified: a whiteware gourd dipper (Vessel 1), a Mancos Black-on-white bowl (Vessel 2), an indented Dolores Corrugated jar (Vessel 3), a Pueblo I or Pueblo II Black-on-white bowl (Vessel 4), and an unpainted bowl (Vessel 5). Site 5MV3945 contained 15 sherds of which three vessels were identified: a Cortez Black-on-white open gourd dipper without handle (Vessel 1), and 2 Mancos Black-on-white bowls (Vessels 2 and 3).

Lithic Material Culture at Chapin Mesa Kilns

With the exception of the ceramics, there was little in the way of material culture associated with these kilns. At site 5MV3969 in the upper fill of Feature 1, a small, faceted hematite paint stone was recovered. This probably represents an item which was accidently lost and fell into the kiln or was simply discarded in the kiln.

Table 10.3. Ceramic Vessel Form Frequencies at Chapin Mesa Kiln Sites

	5MV 3890	5MV 3945	5MV 3967	5MV 3969	5MV 3971	5MV 3972	5MV 3982	Total
Grayware								
Indeterminate Body	6					1		7
Jar body	3	3	4	3	3			16
Cooking/Storage Jar Rim	1					2		3
Cooking/ Storage Jar Neck			1	2	1	3		7
Olla rim	1							1
Miniature thimble bowl				1				1
Indeterminate	3					1		4
Whiteware								
Indeterminate body	14	1		4				19
Bowl rim	19	9		1	1	36		66
Bowl body	31	1			3	13		48
Jar body	39				1	3	1	44
Cooking/ Storage jar rim	3					1		4
Cooking/ Storage jar neck	4							4
Miniature dipper	2							2
Gourd dipper handle		1				1		2
Indeterminate	185			5		2		192
Redware								
Bowl rim	2							2
Indeterminate ware								
Indeterminate body				2				2
Indeterminate	45		1	14				60
Total	358	15	6	32	9	65	1	486

Faunal Remains from Chapin Mesa Kilns

Finely pulverized calcined bone was found in six of nine kilns. Most of this material occurred in the stratum of charcoal bits and ashy soil directly above the tabular sandstone kiln furniture. Of the three sites without bone two (5MV3899 Feature 1 and 5MV3966) received minimal sampling due to time and money constraints, and the samples from the third (5MV3982) were not submitted at all for the same reason. The data presented below will deal only with sites 5MV3899 Feature 2, 5MV3967, 5MV3969, 5MV3972 and 5MV3945.

All bone recovered had been finely crushed and pulverized prior to its introduction into the kilns. The thoroughness of this process in and of itself indicates that the bone was dry, not green (fresh), when the crushing took place. This is an important factor because it weighs heavily as to why the material was introduced into the kilns in the first place.

The first thought that came to mind was that the bone was simply food scraps tossed into the fire as people were standing around during the firing process. The condition of the bone itself negated this hypothesis since food scraps would have been fresh "green" bone not the already dried bone as indicated by the pulverized condition of the material found. Experiments conducted with bone both dried, partially dried, and green clearly showed that only with thoroughly dried bone could the same condition be achieved.

The next thought was that the bone may have been an integral part of the actual firing since most of it occurred in the same stratum in which it was hypothesized that there would have been greenware pottery. Two factors ruled out this hypothesis, one being experimental and the other volume. During the experimental kiln firing at the 69th Annual Pecos Conference, finely ground, dried, turkey bone was sprinkled over the pottery after the secondary fuel load was burned. At the unveiling the following morning it was discovered that anywhere these bone fragments came into actual contact with a piece of pottery, reduction took place and appeared as numerous black speckles on the vessel.

The other negative aspect to this hypothesis was volume. If the bone was an integral part of the firing process then a fairly large quantity would be expected in order to produce the desired results. This however, was not the case. The quantity recovered from the water screening residue ranged from a low of .6 grams (5MV3945) to a high of 129 grams (5MV3972). If these lows and highs were doubled, since they represent only 50% of the total volume of the kiln fill, there was less than a fistful on the low end to approximately two fist fulls on the high end. Therefore, it seems unlikely that such a small volume of material was being used as a fuel source unless the bone was used to trigger a chemical reaction within the fire of which we are not yet aware.

The third hypothesis is more esoteric and untestable, and this is of course ritual. Ethnographically, ritual as an integral part of the Pueblo culture is well known and need not be elaborated here. Ritual can present itself in the form of very elaborate public ceremonies or something as mundane as a mumbled prayer to one's gods prior to performing a simple function. Since bone is hard, the introduction of bone into the firing may have been a mechanism to insure that the fired pottery would turn out hard as well.

The bone itself had been reduced to such small fragments that determining genus or species was impossible using formal faunal analysis techniques. In order to determine genus, which in turn might shed light on the purpose of the bone, samples were submitted to the labs of Archaeological Investigations Northwest (AINW) for blood residue analysis. Blood residue analysis as performed at AINW residue analysis laboratory uses the technique of cross-over electrophoresis, a form of immunoelectrophoresis, to analyze surface residues extracted from stone artifacts and other objects (Williams 1993). Cross-over electrophoresis uses an agarose gel base with known antisera as reactants to identify the types of animals that left protein residues on the surface of tested artifacts. The end result of these tests was virtually negative. One of the samples had a very slight positive reaction to the chicken antiserum which reacts with closely related species such as wild turkey, grouse, and quail. However, this reaction was so weak that stating that the bones are from the wild turkey would be inappropriate and misleading.

Macrobotanical Remains

One of the earliest decisions made concerning these kilns was that sampling would be much more intense than is usual with prehistoric thermal features. This decision came about for two reasons. The kilns themselves were a relatively new phenomena in the archeological record of the southwest and they have raised far more questions than answers. One of the questions raised to explain why the kilns are normally found in the less desirable canyon rim areas concerned fuel availability. It was suggested that this location was used because the more desirable fuels in and directly around the habitation site had been used up and that less desirable fuels in the form of brushy species would be abundant in these canyon rim locations. To test this suggestion, the kilns along the rim of Chapin Mesa were intensively sampled for macrobotanical remains. Fifty percent of each stratigraphic level was recovered and water screened and the residue analyzed. This analysis was performed by Meredith Matthews, Codirector of the Cultural Resources Management Program of San Juan College, Farmington New Mexico (Matthews 1994).

Forty-two bags of macrobotanical remains from seven kilns were analyzed to answer questions related to the possiblity that certain fuels were preferred and that different fuels were present in the different stratigraphic layers representing different phases of the firing process. "The macrobotanical remains were predominately charred wood fragments, representing fuel used during firing. A few seeds and fragments of Pinus bark were also retrieved" (Matthews 1994:1).

Juniper (*Juniperus*) and pinyon (*Pinus edulis*) were predominant in the total of 2,790 fragments of wood weighing 706.5 gm which were analyzed. There were also small quantities of the shrub mountain mahogany (*Cercocarpus montanus*) in all sites but 5MV3966. From site 5MV3967 there was a trace of Douglas fir (*Pseudotsuga menziesii*) and an unknown dicot (Dicotyledoneae). A trace of ponderosa pine (*Pinus ponderosa*) was also found at 5MV3969 and 5MV3972. Samples of pinyon and juniper were consistent from site to site and within each kiln and were apparently the preferred fuels for pottery firing. There was no significant difference in the type of fuel used in different strata.

> "1a. 5MV3899, Feature 1: Juniper seems to predominate, but samples were only submitted from Stratum 1 and 2, which are the uppermost and most disturbed strata and a poor indication of the contents of the kiln.
>
> 1b. 5MV3988, Feature 2: Juniper is strongest in Stratum 4, more-or-less equal with pinyon in Stratum 3, and prevails in Stratum 2.
>
> 2. 5MV3966, Feature 1: Pinyon obviously predominates but a possible bias in the samples selected for analysis may be the reason for this.
>
> 3. 5MV3967, Feature 1: Pinyon is the most strongly represented taxon in Strata 4 and 3, but equalizes with juniper in Strata 2 and 1.
>
> 4a. 5MV3969, Feature 1: Juniper predominates in all three strata analyzed.
>
> 4b. 5MV3969, Feature 2: Pinyon and juniper appear to be equal throughout this kiln.
>
> 5. 5MV3872, Feature 1: Juniper seems to be more strongly represented than pinyon in Stratum 4, but equalizes with pinyon in the overlying strata" (Matthews 1994:15).

The absence of the remains of shrubs such as serviceberry (*Amelanchier*), fendlerbush (*Fendlera*), and sagebrush (*Artemisia*) may result from the fact that they either burned completely or were not used. The absence of oak (*Quercus*), a hot-burning and long lasting fuel wood, may indicate particular needs of the firing regime were not met by this fuel or it was not abundant and available.

"The data showed a definite selective and preferential use of fuel resources, which was found to be consistent for all five sites, and types of fuel used during firing did not change significantly for the different phases of the firing process" (Matthews 1994:16).

Summary of Mesa Verde Kiln Analysis: Material Culture and Fuel Preference

Within the previous sections chronological dating, material culture, and fuel preference have been discussed in detail. All of the kilns appear to have been last utilized at some point in time between A.D. 900 to 1100. These dates are based on ceramic typological cross dating and, in one case, tree-ring dates. In the material culture category, besides ceramics, a small piece of faceted hematite found at 5MV3969 was the only material found. Finely crushed bone was found in six of the nine kilns in the same stratigraphic level and may suggest some ritual. The question of fuel preference was answered with the overwhelming evidence that the prehistoric potters on Chapin Mesa preferred juniper and pinyon.

Kiln Morphology

The most general morphological trait list for these kilns is that they are rectilinear trenches of various lengths and widths, lined around the walls with unmortared sandstone slabs and containing a layer of horizontally placed sandstone just above the level of the excavated floor of the trench. Since these prehistoric people did not order these kilns from a Sears catalog there is of course variability found among the nine kilns.

Four of the kilns, 5MV3899 Features 1 and 2, 5MV3972 Feature 1, and 5MV3982 Feature 1 fit the morphological profile to a tee. Site 5MV3982 was built partially against a bedrock shelf and only the portions not in contact with the bedrock were slab lined. Sites 5MV3966 and 5MV3967 were both unlined but this seems to be the result of prehistoric reuse of the lining stones. At Site 5MV3969 Features 1 and 2 were both excavated into the uppermost stratum of the Cliff House Sandstone and seem to have never been lined with sandstone slabs. Therefore, it would appear that seven of the total of nine kilns, when in use, had been slab lined and the two that were not were constructed into the bedrock and had a natural lining of stone. The fact that some of the lining sandstone slabs were above the floor level of the feature can be best explained as the result of multiple firings. Due to the intense heat generated by a single firing, the lining slabs became oxidized from front to back (interior to exterior of the kiln). Repeated firings render the stones more and more friable and eventually stones must be replaced. Because all of the slabs are not of the same thickness or density they deteriorated at different rates and each was replaced as needed. When a slab was replaced a new one was simply pushed down into the accumulated fill, until solid, instead of removing the fill down to the original surface.

The layer of horizontally placed angular and blocky sandstone slabs referred to as kiln furniture was present in all features with the exception of 5MV3966. The stone layer was always smudged with a layer of carbon but beneath the carbon the stones were 100% oxidized. A pattern of totally oxidized sandstone was present in every kiln that contained sandstone lining slabs and/or kiln furniture. The layer of tabular and blocky sandstone lying horizontally near the floor of the kiln is an integral part of the feature but not really a construction aspect. These sandstone slabs are thought to be the layer on which the green ware (unfired) pottery was placed before the final layer of fuel was placed on top of the pottery (Blinman 1993).

It was from the kiln at 5MV3966 that the tree-ring dates were derived. This particular kiln gave ample evidence that prehistorically it had been abandoned and the usable stone removed and used elsewhere. While in use it is likely that all kilns, with the exception of the two cut into bedrock, were slab lined and that kiln furniture was present in all.

A more intriguing question concerns the variability in size among kilns, particularly the length. The nine Mesa Verde kilns fall into three length categories. Four of the kilns are over 1 m in length but less than 2 m, four are greater than 2 m but less than 3 and the last was greater than 4 m but less than 5.

The width of the kilns is the less variable than the length. Regardless of the kiln length none of them had a width exceeding 1.73 m. The smallest of the kilns at 5MV3969 was 1.45 m in length and 99 cm in width. The largest kiln at site 5MV3972 was 4.45 m long and was the greatest in width at 1.73 m. Those kilns in the less than 2 m category had an average width of 85 cm. Those in the 2 to 3 m category had an average width of 1.25 m. Therefore among the Mesa Verde kilns the smaller the kiln in length the correspondingly shorter the width across the center.

The final two factors of kiln morphology are their area and depth. Of the two, depth is probably the more crucial. The area of any one kiln is simply an expression of the intended purpose of the potter or potters who constructed it. If the kiln was to be used by a household or interhousehold group for their own immediate needs the size and floor space (above the kiln furniture) would be fairly small. On the other hand if craft specialization was taking place with its concurrent trade network then a kiln with multiple square meters of floor space would be expected. Another scenario that will be presented in more detail further along is that the kilns are communal property and specific clusters of kilns are utilized by members of that community. The smaller kilns may have been used to produce pottery for domestic use and the larger kilns used to produce a surplus which was then used as either personal resupply or trade items.

To judge by the relatively uniform depths to which the kilns were excavated, this variable was a vital ingredient leading toward a successful firing. The depths in the Mesa Verde kilns ranged from a low of 27 cm to a high of 57 cm. In centimeters two of the kilns were in the 20s, two were in the 30s, four in the 40s and one in the 50s. The norm seems to be around 40 cm with a range somewhere between 35 cm and 45 cm. Some of the variability in depth most certainly derives from post abandonment erosion and historic disturbance. This same trend is apparent in averaging the depth of 18 previously excavated kilns to 34 cm. If the two extremes of 10 and 15 cm at the low end and the two extremes of 64 and 55 cm at the high end are discarded a new average of 31 cm for the 18 previously excavated kilns is met. Kiln depths appear to be a patterned phenomena and are an integral part of a successful firing.

The overall depth of a kiln from the floor up to prehistoric ground surface is not all utilized during the firing. The lowermost 10 to 15 cm is filled by a bed of coals generated by the primary fuel and the placement of the kiln furniture. Using a kiln with an average depth (40 cm) this leaves 25 cm from the top of the kiln furniture to the top of the lining slabs. All known pottery forms with the exception of ollas would fit into this space without extending above the lining slabs. The height of a sample of thirty ollas from the Mesa Verde collections was measured. Of these thirty, 21 were greater than 25 cm in height, however only nine of these exceeded 30 cm. This 25 cm band seems to be critical for successful firing and may have to do with maximizing the access to free oxygen. Some of the deeper kilns which exceed the norm in depth may have been specifically used for large ollas. Whatever the reason, the depth of kilns appears to be in accord with a predetermined formula and not simply an arbitrary depth ascribed by the builders.

The Chapin Mesa kilns represented a cluster of features which predate all but one of the previously excavated and reported kiln features. With all 27 reported kiln features in the Four Corners Region as a data base is was hoped that morphological attributes might be chronologically ordered and therefore a kiln might be dated even when no diagnostic artifactual material was present. But instead it appeared for all intents and purposes that all of the kilns, whether Pueblo I or Pueblo III were morphologically constructed in the same manner. The only morphological trait change which occurred early to late, which differed from the norm, was that some of the Pueblo III kilns were reported as having a shelf at one end (Fuller 1984). This single trait may be a late innovation to kiln construction during the Pueblo III period that wasn't present in earlier kilns. However, with the limited data base that exists at the present time, this is by no means certain, and a resolution will have to wait for a much larger data set.

Location of Kilns: a Two Part Explanation

During the course of the Mesa Verde Waterline Replacement Project Phase III a series of nine prehistoric pottery firing trench kilns were excavated. All of the features were found within 1 km of each other on two fingers of Chapin Mesa that jut out from the western edge of the mesa (Figure 10.1). As has already been demonstrated all of these features date to the Pueblo II time period circa A.D. 900 to a point prior to A.D.1100.

Within a radius of 1.2 km of the kiln sites there is a total of 59 habitation sites dating to the Pueblo II period. These sites are clustered into two community clusters and one neighborhood as those terms were defined during the Dolores Archaeology Program (Kane 1986:31) (Figure 10.21). The largest community cluster lies southeast of the kiln area and consists of a tight cluster of 29 habitation sites. North and east of this community are 14 loosely grouped habitations that have been defined as a neighborhood. North and west of the neighborhood is another tight group of habitations consisting of sixteen sites, which has also been

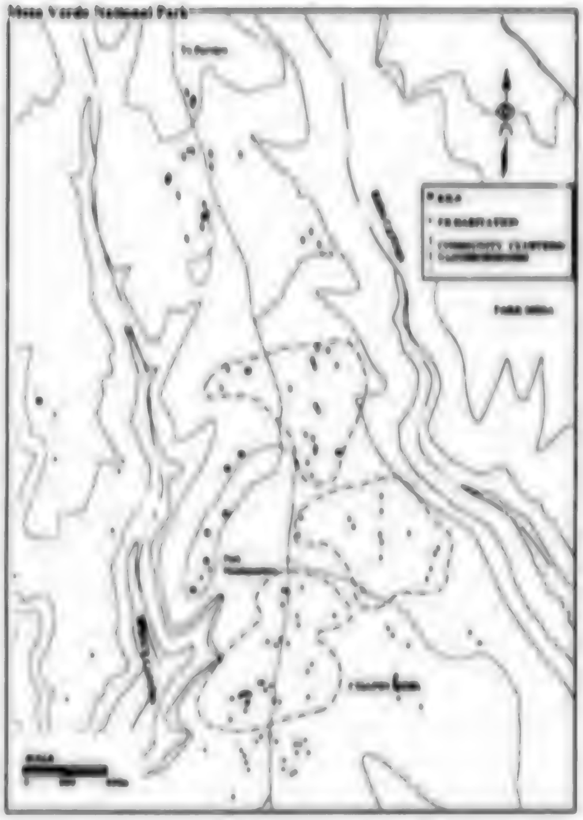


Figure 10.21. Location of kilns and Pueblo II habitation sites within 1.5 km of project area.

defined as a community cluster. All of these sites were visited and reevaluated in an attempt to firmly estab- h their chronological placement in the early Pueblo II period comtemporary with the kilns. Thirteen of the sites seem to have been occupied only during the early Pueblo II period and six were assignable to the late Pueblo II period.

The prehistoric trench kilns are located away from the habitation sites, and are usually near the edge of mesas or on the slope below the rim and above the bottom of the drainage. The reasons for this phenomena have been many and varied. The preferred fuels (pinyon/juniper) in and directly around the habitation may have been so depleted that the potters had to move the kilns further away in order to secure the large quantity of preferred fuels required for a successful firing. Another scenario is that the ritual accompanying pottery production was such that the general public was not invited to attend. The necessity of saving the better agricultural soils for farming thus relegating pottery firing to the marginal areas has also been proposed to account for the kiln locations. Finally, and probably one of the most valid, is that near the edges of the mesas the wind tends to consistently move steadily up canyon in the morning due to solar heating and down canyon in the evening as the sun sinks and temperatures cool. This last suggestion is one factor of the two part hypothesis presented here to explain this apparent pattern in kiln locations.

In the following hypothesis, the location of these pottery firing features is viewed as the result of both technical and social considerations. From a technical perspective location near the edge of a mesa or drainage is preferable because of the predictable air movement present in these areas. These steady breezes are the result of heating and cooling of the earth's surface by the sun and are most active during the summer months when temperature extremes are the greatest. Since oxygen is the main ingredient needed by fuel to produce high firing temperatures the prehistoric potters would not have overlooked a reliable steady source relatively close at hand.

By positioning the kilns parallel to the slope and across a small drainage, they would be tapping into this upcanyon air flow, this would insure them a constant broadside breeze that passed equally across the full length of the kiln. If, for instance, they were to position the kiln up and down the slope they would in affect create a flue that would create problems in the control of the heat and fire.

The second scenario in this hypothesis is a social one. We tend to forget that the contemporaneous habitation sites scattered about across the landscape are not isolated entities; they do not stand alone but are parts of a larger social interaction sphere. This interaction sphere can occur at the community or neighborhood level and extend beyond to the interregional level. For the purpose of this discussion we will stick to the community cluster and neighborhood level of interaction since the actual production of pottery is what we are talking about, not its distribution on a regional scale.

In this hypothesis, it is suggested that the kilns are not the property of single individual families, but rather they are communal property used by members of affiliated communities and/or neighborhoods. To test this hypothesis, all Pueblo II habitation sites within a 1.5 km radius from the center of the cluster were plotted. This resulted in the identification of 59 sites which could be contemporaneous with the kilns. Once plotted the sites, based on their degree of clustering, were subdivided into two community clusters. The more tightly packed community clusters were spatially separated by a cluster of less tightly packed habitations termed a neighborhood. An analogy to this pattern could be two urban centers separated by a rural area. The resulting plot shows the nine kilns strung out in a north-south line along the west side of these habitation clusters. Note the near absence of habitation sites along the line presented by the kilns, and the tight groupings of habitation sites which make up the two community clusters and the neighborhood. Without the luxury of absolute dates for either the kilns or the 59 habitation sites the number of possible kiln users, or for that matter how many of the kilns were used at any one time, is impossible to say. The important point to this hypothesis is the spatial pattern presented by the kilns in conjunction with the habitation sites.

Two arbitrary assumptions were made at the beginning of this hypothesis. The first was that the few kilns we knew about and excavated were by no means all that were on Chapin Mesa. Any suitable canyon rim areas, on either side of the mesa probably are equipped with kilns. The other assumption was that the groups of people living across the canyon systems to the east and west of the study area probably had their own pottery firing facilities. Also that these people would not try to transport greenware across either system to utilize the features on Chapin Mesa. These assumptions were both tested in a rather small way but tested nonetheless. To test the first assumption three additional kilns, all on Chapin Mesa were located and two of these were outside the range of the 1.5 km area of this study. One of these was on the east side of Cliff Canyon north of Cliff Palace ruin, another was in the visitor trail near Cedar Tree Tower and the third was next to a park employee trail near the housing loop and the maintenance yard. This third feature is within 40 m of site 5MV3899. This random sort of survey is anything but inclusive however it does adequately address the first assumption and that is that there are other kilns out there besides the nine that were excavated. The second assumption was addressed in much the same way. Across Spruce Canyon to the west of our study area an aditional kiln was located along the west side of this finger of Chapin Mesa. This testing of the two assumptions strengthens their validity. The point here was to strengthen the argument that clusters of kilns are probably associated with individual community clusters and neighborhoods as stated in the original hypothesis.

The very act of gathering enough fuel for a single firing would be a task for members of a single family even with the help of immediate relatives. Another draw back is that the fuel in the immediate area of the kilns would quickly be depleted since a small group would be forced to gather the fuel nearby. On the other hand, if pottery firing is viewed as a social event participated in by an entire community, then the fuel would be a relatively simple matter to overcome. If the participants from the surrounding community each arrived with a bundle of fuel gathered on the way, then fuel depletion in the immediate area of the kiln or kilns to be fired would be reduced or eliminated.

Interpretation

The kilns are found within a narrow corridor on two southwesterly extensions of Chapin Mesa, which jut into Spruce Canyon. It will be assumed that the Pueblo II residents across this canyon had their own pottery firing facilities and were not transporting greenware across a canyon system in order to utilize these kilns. Another assumption is that any Pueblo II habitation sites within 1 km of the kilns could be potential user of any one of these kilns. This distance is an arbitrary designator and since the mesa is relatively flat in this section of the mesa, greenware may have been transported from further away. A factor to keep in mind is that all favorable locations near the edge of mesas probably contain kilns comparable to the nine excavated examples. In other words these nine kilns are only a handful of the hundreds of potential kilns within the bounds of the Park.

Conclusion

This hypothesis states that the location of the kilns near the mesa edges and away from habitation loci was the result of both a technological as well as social factors. The kilns were geographically situated to take advantage of the constant breeze moving up the canyons in the morning due to solar heating and back down the canyons in the evening as the earth cools. By taking advantage of this steady air flow higher temperatures within the kiln could be reached thus producing a better product.

If the features are communal property, then the canyon rim areas found around the communities make them equally available to all without intruding onto valuable arable land which is found nearer the habitations. As a community social event with participants from surrounding areas supplying some or most of the fuel, the depletion problem would be reduced or eliminated altogether. As an integrative mechanism a firing is unparalleled if the firings performed at the annual kiln conferences are any indicator.

Firing Regime and Stratigraphy

The firing regime utilized by the prehistoric potters is reflected in the stratigraphy viewed today by the archeologist during the excavation of these features. The stratigraphy for all the kilns has thus far been described but not interpreted. There were four cultural strata repeatedly present in the Mesa Verde kilns, as well as most of the kilns excavated in the Northern San Juan Region. The following interpretation of the firing regime and interpretation of the stratigraphy is based on a cooperative effort by both archaeologists and potters. One potter who has performed more experimental firings than any other and has performed them in a scientific manner is Clint Swink of Ignacio, Colorado. The following interpretation and discussion of the actual firing of a kiln, will therefore be presented by Clint Swink in acknowledgement to his expertise in the actual mechanics of primitive firing of open trench kilns.

Firing Anasazi Trench Kilns

Clint Swink

Excavations of nine Pueblo II Anasazi trench kilns in Mesa Verde National Park yielded the most detailed and comprehensive look at these features to date. The majority of previously described kilns in the Mesa Verde Region dated to the Pueblo III period (Fuller 1984). All excavated kilns, including one of the Pueblo I period (Hibbets 1984), are similar enough in shape and stratigraphy to suggest temporal, spacial, and technical firing strategy commonalties.

On May 16, 1993 Joel Brisbin and I conducted an experimental firing to test the implications of his recently unearthed kiln stratigraphy which suggested four discrete firing stages. I designed a firing sequence that resulted in a similar stratigraphy with mixed but encouraging results (Swink 1993). Since then, this initial firing regime has been increasingly tuned and tested in 33 firings of 750 pieces of hand built pottery constructed exclusively from materials available prehistorically. The firings produced varied results; all consistent with the archeological record.

A wide variety of native body clays (pastes), slips, and paints have now been tested using this experimental firing sequence. The best results have been achieved with a carbonaceous paste, a white montmorillonite slip and organic paint made from purple Rocky Mountain Bee Plant, Cleome serrulata. Results with iron mineral paint have been inconsistent and additional research is needed. Successful firings were judged to be those that produced ceramic qualities of hardness, color, paint retention, and paste cross section consistent with those aspects observed in prehistoric pottery.

The replica kilns were sandstone lined trenches, ranging in size from the smallest to the largest recorded in Mesa Verde National Park. The firings were multi-seasonal; conducted in all reasonable weather situations on various terrain, day and night.

This firing regime was designed to produce both replicas of Anasazi pottery and replicas of the stratigraphic sequence found in the Mesa Verde trench kilns. The firing process which was developed consisted of four discrete stages: the primary fire, the setting, the secondary fire, and the smothering. The primary fire represented the lowermost stratigraphic layer of pure carbon which had not been totally consumed. The setting represented the blocky, angular, and/or tabular sandstone in the next stratigraphic layer. The secondary fire represented the charcoal rich ashy soil stratigraphic layer which was partially intermixed with the sandstone layer. The smothering represented the fourth and final prehistoric cultural stratigraphic layer of redeposited sterile soil.

In the following format, the subtopic Archeological Interpretation refers to how the stratigraphy was thought to relate to firing a prehistoric Anasazi trench kiln. Experimentation explains how an experimental trench kiln firing may reproduce the stratigraphy. Discussion deals with what has been learned or may be implied.

Primary Firing

Archeological Interpretation

The lowest stratigraphic level in excavated kilns is consistently a deep layer of carbonized organic material. This was interpreted as smothered fuel: the residue of a first stage of firing which is referred to as the primary firing.

Experimentation

To create this stratigraphic level, a fire was lit in the trench using arm-sized and smaller fuel or charcoal from previous firings (Figure 10.22). This fire dried out the trench lining and left a thick bed of coals to supply some of the heat during later stages of firing. Kiln furniture or shelving (blocky and tabular sandstone to be used to support the ceramic vessels) and/or pottery was placed around the kiln perimeter to dry as necessary.

Figure 10.22. Primary firing of kiln during the 1994 Pecos Conference at Mesa Verde National Park.

Enough fuel was used in this stage to form an even coal bed no less than 6 cm deep. Both pinyon pine and juniper worked well as primary fuel; burning hot and holding a coal well. Softer fuel that quickly reduces to ash or an ash covered coal was less desirable as primary fuel. It was difficult to reignite later when additional heat from this source was required; and, overall, the softer fuel produced fewer Btu's. The production of blocky coals that allows air passage and generates high temperatures was the goal of the primary firing.

From experimental firings it was learned that heavy smudging occurs on montmorillonite slips when the primary fuel is not first reduced to a flameless bed of hot coals. To maximize this fuel source it was evident the pottery was loaded in the kiln when this coal bed was hot.

Discussion

The oxidation band or rind seen in the bottom of all prehistoric kilns was probably produced during the initial primary firing when the fire was sufficiently shallow to allow the heat to penetrate and oxidize the intrior kiln surface. Subsequent primary firings seem to have little cumulative effect on this aspect of the kiln unless the kiln is totally cleaned out before lighting the primary fire.

Prehistoric kilns show varying depths of primary fuel residue. Deep layers of material probably represent an accumulation of primary fire residues since deep layers of coals have been shown to be ineffective. Shallow layers could indicate newer kilns or kilns cleaned out between firings. Layer depth and sandstone slab condition can be used as evidence for the amount of kiln usage.

It has been found that only the top layer (± 6 cm) of coals is effective fuel and is crucial to well fired ware. Subsequent firing management determines the effectiveness of this heat source which can produce short duration firing temperatures in excess of 1200°C (2192 degrees F). Average maximum temperatures can be expected in the 800°-900°C range (1472 to 1652 degrees F) for 15-30 minutes during peak kiln performance.

Setting: Shelving, Pottery and Cover Sherds

Archeological Interpretation

The blocky and angular sandstone slabs and cobbles in the second deepest stratigraphic layer were easily interpreted as pot supports, or kiln shelving (furniture) based on previous firing experience. Large and small pottery sherds from a variety of types of large vessels were occasionally mixed with these stones. These artifacts of the second and third deepest stratigraphic layers were less easily interpreted. Either they were the remains of failed vessel firings or possibly the remains of cover sherds.

Experimentation

Previously fired, preheated and dry tabular, angular, and blocky sandstone pieces were placed on the coal bed created by the primary fire. This shelving supported the vessels, maintained a uniform height for the setting (thicker stones were placed under shallower vessels), and created flues which directed air to and heat from the primary fuel. The slabs and blocks of the shelving were spaced to allow air and heat circulation while they provided adequate support for the vessels. The sandstone also played the important role of temporarily dampening the heat of the coal bed, allowing the vessels to be placed into the kiln trench with some degree of comfort and safety (Figure 10.23).

Because the period of maximum heat was short, the pottery setting was open and limited to a single layer. Vessels of similar height were placed together. Bowls were inverted, projections and delicate rims placed toward the interior of the setting, and painted portions of vessels were prevented from touching another vessel to avoid possible design transfers.

The use of cover sherds had proved beneficial in previous firings. Dry cover sherds were placed loosely over the vessels. These protected the pottery from the thermal shock of the secondary fire, carried some of the weight of the overlying fuel and smothering layers, and created a small lid or roof over each piece that, to a small degree, contained the mini-atmosphere around the vessel.

When complete, the top of the setting was at ground level. The recurring element of successful firings was making sure that the sum total of vessel height, shelving thickness, and depth of primary fuel did not protrude above ground level. Experience was the key in knowing which of these factors to vary for optimum performance.

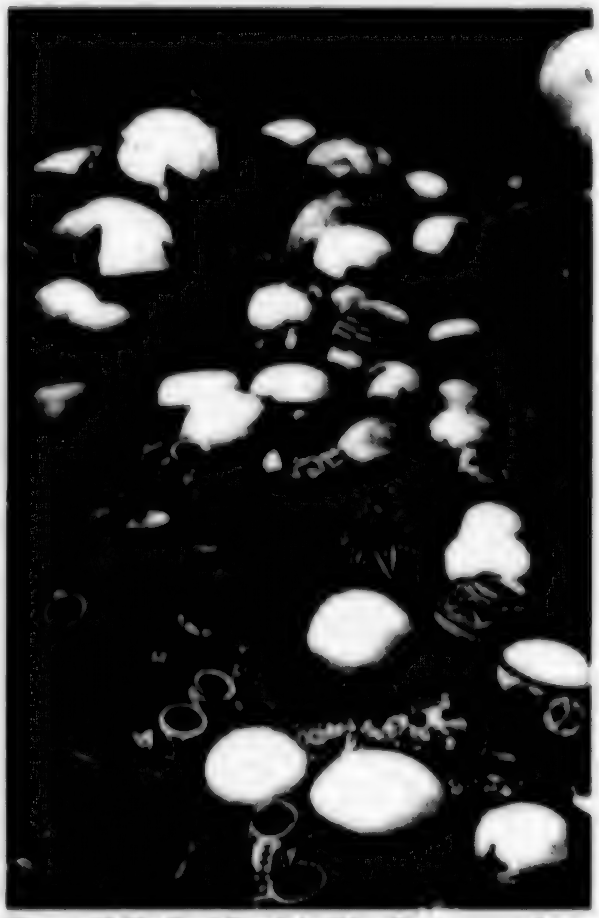


Figure 10.23. Paul Ermigiotti loading pottery into the 1994 kiln.

The setting was left in place, slowly heating up until a cover sherd sizzled when touched with a wet finger. In the case of organically painted pottery this heating was crucial. It allowed the paint to slowly carbonize and alter the slip; effectively painting the pot. At this point, the secondary firing was started.

Discussion

In an archeological site, the prehistoric kiln shelving has probably moved very little from its position during its last use and therefore can give important clues to the nature of the kiln's final firing. The distance from the top of the shelving to ground level may indicate relative vessel height (allowing for compression of the primary fuel layer). In plan view, internal kiln features such as vents and flues may be present. The density and thickness of the shelving may indicate firing strategies utilized to direct the air from the primary fuel or to accomodate specific firing conditions such as wind. Shelving condition in the amount of spalling and color is a relative measure of kiln reuse. The more spalling the longer the shelving was probably used. The color of the shelving stones, red, gray, or black, may indicate the type of firing atmosphere (gas mixture).

Because the pottery is loaded into a hot kiln, it must be thoroughly dry. If not, physical water in the clay rapidly turns to steam at or near 100°C (212 degrees F) ; cracking or spalling the pottery. This absorbed interlayer water continues to be driven off in montmorillonites until 250°C (453 Degrees F) (Shepard 1965) creating a large window of spalling opportunity. The common occurrence of ceramic spalls in prehistoric kiln assemblages in this stratigraphic layer suggests this was a frequent Anasazi problem.

Replicated and seen infrequently on prehistoric pottery are the indications of single water drop marks on the pottery which could well be sweat that dripped from the brow of the kilnsman during loading of the hot kiln.

The relatively common width found in kilns is the comfortable working distance to the center of a hot bed of coals from both sides. Said differently; kilns are two-arms-length wide and long enough to accommodate the current load of pottery.

Sometimes intermediate walls are seen in kilns (Brown 1991; Helm 1973). These "bag walls" were probably constructed to accommodate smaller loads of pottery than those for which the kiln was designed. Such was probably the case in 5MV3982 which had been shortened 36 cm.

My experience has shown kilns hold an average of 15 pieces of Mesa Verde style pottery per square meter. This number represents an estimate of typical household replacement production. Specialized production such as large jars or small mugs would alter this number quite a bit.

Sherd presence or absence in kilns makes cover sherd usage problematical. Recent research (Swink 1995) indicates in all likelihood it was an option exercised by some. Like Feature 1 at 5MV3966 which had been robbed of construction material, lack of sherds may indicate their salvage and reuse in other kilns. Interestingly, a rough correlation can be made between distance from habitations and amount of ceramic material recovered from kilns: the closer the habitation sites the less ceramic material is recovered from the kiln. The rather isolated kilns of the Woods Mesa group (Fuller 1984) were rich in ceramics when compared with most of the nine Mesa Verde kilns which were much closer to contemporaneous habitations.

Cover sherds are a calculated gamble. At best they are a buffer against all that can go wrong in a firing: breakage from thermal shock, cool drafts, falling fuel and smothering soil contact, over-oxidation (excessively oxygen rich atmosphere) and smothering soil smudging. Additionally they provide air and heat flow by preventing accumulations of coals and ash between the pots which would plug these valuable passageways. At worst they are an insulator between the pottery and the majority of the firing heat supplied by the secondary firing and prevent visual inspection of the pottery condition during firing. Their use today as well as prehistorically represents a balance governed by desired results from numerous materials and variable firing techniques.

Secondary Firing

Archeological Interpretation

By far the thickest layer identified stratigraphically by Brisbin was the third layer from the bottom of the kilns, a charcoal rich ashy soil with oxidized spalls of sandstone and ceramic material. The nature and amount of material combined with location could only be the residue of a big fire: the secondary firing.

The secondary fuel layer seems to have provided the majority of the heat for the firing and created a draft for further combustion of the primary fuel layer. A crib/spanner fuel arrangement proved necessary for avoiding preignition, to produce a relatively slow thermal rise which lengthened the working time. Fuel was placed quickly over the setting in such a way as to create maximum draft. Long leg-sized "spanners" or beams were laid across length of the kiln to provide support for a crib of smaller fuel that was built as high as the kiln was deep (Figure 10.24). Arm sized "rafters" were placed across the kiln width from spanner to kiln edge and spanner to spanner if the kiln size warranted. Best results were obtained by keeping a very open cribbing and using large fuel closest to the setting. The idea was to create maximum draft in order to raise primary fuel temperatures, maintain radiant heat from the secondary fuel as long as possible, and later create large pieces of charcoal that would burn hot due to the increased air flow around them. Juniper was my fuel of choice for burning hot and holding a coal. Keeping the secondary fire open, well drafted and hot were crucial to well-fired pottery. Limbs of all sizes, lengths, and species worked well above the rafters; brushy and branchy fuel contributed to the openness and draft of the secondary fire. Too much small fuel at this point however, was found to choke the secondary fuel coal bed in the later stages of the firing. During fuel loading, no fuel was allowed to come in contact with the primary coal bed in order to avoid premature ignition. The ultimate model was a very hot coal bed above (secondary) and below (primary) the pottery. This layering generated high heat while at the same time it limited oxidation of the pottery.

After the fuel crib was in place, this secondary fuel was ignited at the top of the pile. Figure . Management of the combustion of this upper layer was crucial; it determined, to a large degree, the quality of the pottery in terms of both temperature and atmosphere. Wind and the internal draft, combined with the kilnsman's sense of desired temperature and atmosphere, dictated the amounts and placement of additional fuel. Upwind additions of fuel limited oxidation, downwind fuel increased oxidation and temperature. The need to balance these factors determined the duration of this stage of firing.

Figure 10.24. Secondary fuel being laid over kiln by Chris Pierce and Clint Swink (1994).

Optimum temperatures were reached when the secondary fuel was reduced to an "open" bed of coals. Done correctly the fire was still drawing some air around the margins, yet limiting oxidation of the pottery while the primary and secondary coal beds were at peak temperature: open enough to be hot but tight enough to be limiting the air flow (oxidation) to the pottery. Done incorrectly the fire could either smother itself with ash and small coals to never achieve sufficient temperatures for quality ware or be too open: cold and oxidizing. Ideally, the fire drew enough air to create maximum temperature but not enough to oxidize the pottery beyond the desired whiteness. Success of the limited oxidation process in replicating Anasazi ceramics was indicated when the outer layers of the carbonaceous clay body were oxidized, leaving an interior carbon streak. The next experimental step was smothering.

Discussion

The importance of draft was clear. Site selection of kilns may have been greatly influenced by this factor. Experience showed that having the prevailing wind perpendicular to the kiln's long side resulted in a more manageable and efficient firing. By locating kilns across small drainages, natural air flow was maximized.

Fuel availability may have been the primary factor influencing site selection, especially during late Pueblo III times. As part of the experimentation, the fuel consumed in replica firings of this regime was measured. There was an average consumption of 6.575 kg (14.49 lb) of fuel per vessel, demonstrating a major resource drain (Karen Adams, Susanne C. Edminster, Mark J. Hovezak, personal communication 1995). The fuel preference for pinyon and juniper may have also influenced site selection. On the other hand, fuel depletion may have influenced fuel selection. The absence of oak in the Mesa Verde kilns is curious and needs additional research. Was it poor firing fuel or such good fuel that it was depleted from the scene leaving only pinyon and juniper? The nature of the fuel is as important as type. Prehistoric wood gathering tools and practices certainly determined the nature of the fuel entering the kiln. Gathered fuel may burn differently from fuel processed with chain saw and as.

During the secondary firing the oxidation rind around the upper portions of the kiln edges continued to develop as high temperature levels were achieved. By elevating the fuel and arranging the largest members closest to the pottery, a moderate temperature rise during initial stages of combustion of 15-30°C (59 to 86 degrees F.) per minute was expected. Actual temperature rise depended on wind velocity; and type, condition, and arrangement of fuel. This rapid rise in termperature was important because as the temperature rose the pottery began to harden. By the time the secondary fuel cribbing collapsed, the pottery was hard enough to survive most falling fuel incidents. If this rise was too rapid however, spalling occured around 500° ± 100°C (932 degrees F. to 183 degrees F.) when clay's water of crystallization is driven off (dehydration). The actual temperature range of dehydration varies with clay type and rate of heating (Shepard 1956). Another critical temperature encountered during the secondary firing occured at 572° ± 2°C (1061.6 degrees F.) when there is a volume change of 2% when the quartz constituents in clay change. Passing this temperature too quickly either rising during secondary firing or later may create different firing temperatures in parts of individual vessels which will cause them to crack.

Temperature measurement is not critical for knowing when a fire is growing nicely or raging out of control. Fire growth is governed by the amount of secondary fuel initially ignited balanced against later additions. Experience with wind and fuels is the key to success. In this respect kilns 3 m and larger fire much differently from smaller sizes. Since the initial charge of fuel is so large in bigger kilns, very rapid temperature rises can be anticipated. To counteract the conflagration model, I prefer to light one end of kilns longer than 2 m and allow the fire to progress slowly down the trench, refueling as necessary. Although I have no experience with very large kilns I would expect firing them is a process that starts in one end and progresses along the trench.

Pottery temperatures of 800°-900°C (1472 to 1652 degrees F.) for 30-45 minutes were optimum. It was not necessary to monitor temperatures to know when the firing was completed. As the flames from the secondary fuel subsided, the pottery was at peak temperature if the fire was still open. The temperatures will maintain at peak until the fire collapses and smothers itself thus shutting off oxygen, or when the fuel is consumed and larger quantities of fresh air come in contact with the pottery, both cooling and oxidizing it. Judging the condition of the pottery, which was invisible beneath the coals and cover sherds, was the most important, difficult, and agonizing job of the kilnsman. Peeking at pots is an option but once the cover sherds are removed the temperature of the underlying setting drops (never to return) and almost always creates some oxidation. This is a pot sacrifice scenario and may or may not be indicative of the whole setting. Results have repeatedly shown major intra-kiln firing differences in lateral and vertical separation of just a few centimeters; clearly a trench kiln firing is a composite of many micro-firings. In some cases, especially at night, the glow of the pottery can be seen here and there and is the best indicator of good temperatures.

The secondary firing is complete when intuition and/or inspection determines the pottery has achieved maximum temperature with minimum or limited oxidation and is ready for smothering.

Smothering

Archeological Interpretation

By far the most important aspect of Brisbin's stratigraphic work was the recognition and identification of what turned out to be the last phase of the firing sequence, the smothering. The layer of redeposited sterile soil he described was the key to solving the firing puzzle. It was interpreted as being the conclusion of the firing sequence creating an oxygen free final atmosphere for the pottery.

Experimentation

At this point the kiln was covered with enough soil to create a thick layer of earth, smothering the fire and shedding any rain that might fall (Figure 10.25). The soil contained nothing that would create smoke which would smudge the pottery. Clayey soils with body worked best and protected the setting from all but the most severe cloudbursts. Sandy soils were less waterproof and had a tendency to collapse and vent more readily. If any air vents developed through the smothering layer as charcoal shifted they were covered immediately to avoid reignition. If vents went undetected, reignition occured and the kiln could burn for days, oxidizing the pottery. This smothering layer allowed the temperature in the kiln to drop without further oxidation of the pottery and insured a slow temperature decent. Because all of the volatile compounds in the fuel had already been exhausted, the smothering did not result in smudging. Because oxidation was prevented slips were white, organic paints were black, and carbon streaks were present in pastes.

Discussion

Since soil was an important ingredient in the firing process, it may have also been a factor in site selection. In some areas I have seen where a shift in the kiln location of only a few meters would have placed it in a soilless situation. The two kilns at site 5MV3969 and the one of a pair at 5MV3899 are exceptions to this idea, being built into sandstone. Perhaps rock, in these cases, was a more valuable resource than soil and the soil was brought in from another location. In other words, perhaps it was cheaper to import soil than rock.

Premature smothering resulted in soft, under fired, dark pottery. During burning of the carbonaceous material in the paste, the slip was smudged from within and turned black. Without sufficient time at peak temperatures this carbon was not oxidized. The pots were soft because they had not been completely fired (had not matured). Smothering too late resulted in oxidized ware. The iron present in the slip and/or painted areas turned a warm white, yellow, orange or red. Because the soil layer extinguished the fire while it maintained the residual atmosphere, the net result of this regime was most likely a neutral atmosphere rather than oxidation or reduction (oxygen starved atmosphere).

It is appropriate at this point to discuss oxidation and reduction and their relationship to this firing regime. There is no better explanation of firing atmosphere than that given by Anna O. Shepard (Shepard 1965:216-217)

> We speak of firing atmosphere as being oxidizing or reducing. When there is a good draft affording an excess of oxygen over that required to burn the fuel, the atmosphere will be oxidizing, which means that, given the requisite temperature range, carbonaceous matter in the paste or soot on the vessel surface will burn out; then after removal of carbon, which has a stronger affinity for oxygen than does iron, the iron oxides will be brought to their highest state of oxidation. If, on the other hand, there is insufficient oxygen for complete combustion of the fuel, and reducing gases (carbon monoxide, hydrogen, hydrocarbons) that rob other substances of oxygen are present, carbonaceous matter in the paste will remain unburned; and at certain temperatures, iron oxides will be reduced to a lower state and their color effect will be gray instead of red. The reactions in either an oxidizing or a reducing atmosphere will be more or less intense, depending on the composition of the gases, the relative volume of the active gases, the temperature, and the period of reaction. When firing atmosphere is fully controlled, it can also be made neutral, neither yielding nor taking oxygen. In open firing there is always a mixture of gases; only by rare chance and then momentarily would the reducing gases formed in the burning of the fuel be fully oxidized, leaving no excess oxygen in the process. Nevertheless, there may be conditions in which there is little exchange of oxygen between the atmosphere and the constituents of the pottery because there is only a slight excess of oxygen and neutral conditions are approached or temperatures are too low for oxidation to occur (Shepard:216-217).

The use of a smothering layer of soil suggested by the stratigraphy of excavated Anasazi kilns seems to provide a prehistoric example of a unique firing regime which produced unusual and distinctive ceramics. This uniqueness, to a large degree, is attributable to the effect of the atmosphere created after the smothering. It is clearly not a reducing atmosphere

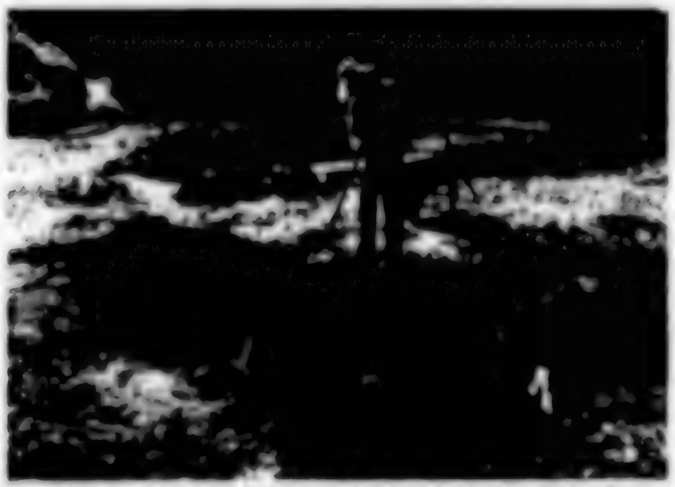


Figure 10.25. Joel Brisbin smothering kiln with dirt after the secondary firing was complete (1994).

because of insufficient temperatures and the fact that oxidized ware entering the smothering phase comes out unchanged. It is certainly not an oxidizing atmosphere since no oxygen whatsoever is available after it is consumed by the coals. It would seem then that Anasazi potters intentionally created conditions that not by "rare chance", produced a neutral atmosphere. Additional measurement and research is needed before this firing regime can be truly characterized.

The calcined bone fragments recovered from the Mesa Verde kilns may be an atmospheric control mechanism. Dried bone burns without smoke thus generating reduction gases without the carbon. It is conceivable that the bones were added at a crucial point to aid reduction. Given the small quantity recovered it seems at first unlikely but certainly not impossible; research continues along these lines.

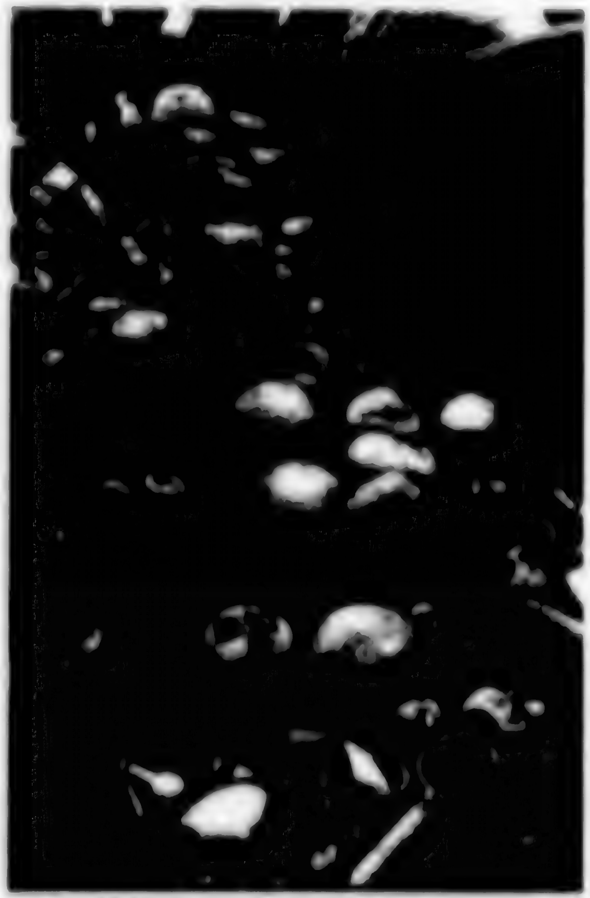


Figure 10.26. Anxious potters, Bruce Bradley, Paul Ermigiotti, and Lee Lacey removing vessels from the kiln (1994).

Opening the Kiln

Archeological Interpretation

The mixing of the smothering soil and secondary firing residue as frequently noted by Brisbin would indicate that prehistorically pots were simply pulled from the setting rather than excavated. That all the kilns found to date have had the smothering layer intact (although misinterpreted), indicates kilns were not excavated for pottery removal. It seems unlikely that all kilns would have been back filled given the universal human propensity for avoiding completely unnecessary tasks.

Experimentation

If reignition did not occur, a 2 m kiln cooled relatively rapidly and was ready to open in 18 to 24 hours; bigger kilns took longer. The temperature was low enough to remove pots when a finger could be inserted through the soil and could touch a cover sherd comfortably. Pots were removed by simply reaching through the overburden, locating a pot and pulling it out (Figure 10.26). Everything was then left in place for the next firing, either to be reused or discarded at that time.

Discussion

Much can be learned from carefully excavating a replica firing and conducting a postmortem of the event. I strongly suggest unwrapping the kiln slowly not only to savor the event but to glean as much information as possible, plus on the practical side much of the material can be recycled.

The soil layer can be removed and set aside for the next firing, and unconsumed charcoal of the secondary fuel layer can be saved to contribute to the primary fuel of future firings. Cover sherds are removed to expose the pots which are in turn removed. Kiln shelving can be left in place until the kiln is used again, at which time the stones are removed and set to the edges of the trench for warming and drying. If the potter roots through the setting rather than removing the soil layer, small pots can easily be overlooked in emptying the kiln which may still be hot enough to affect the search. One excavated kiln in the Woods Mesa group contained two mugs which may have been overlooked during unloading (Bradley 1982). This type of unloading will mix the upper two layers to a certain extent a characteristic which was frequently seen in the stratigraphy of the Mesa Verde kilns.

Depending upon when the kiln is opened, the presence of a few live coals and the renewed air supply can cause reignition. To the extent that the earth layer has been removed, both the primary and secondary fuel charcoal can burn completely to ash.

Social and Season Implications

Authentic replication affords accurate measurement. The measurement in human effort required to fire pottery in a trench kiln is enormous, reflecting the high cost of pottery production and measuring its value. Only 6.6 kg of fuel per vessel does not sound like much until seen en masse at a 4 m kiln firing. The fuel amount alone represents so many man hours that a group effort is implied. A group effort is also implied for transporting greenware (unfired pottery) to the kiln site from the habitation, presumably the place of manufacture since it must be stored out of the weather until it is fired. The replication of greenware transportation in similar terrain has shown this to be difficult. The best method has proven to be one person carefully carrying one or two pieces. No satisfactory burden basket-type large loads have been tested successfully yet. My social model employs people carrying pottery, gathering fuel, stones and soil, and celebrating the importance of the event before, during, and after the firing.

Because greenware is highly susceptible to rain damage and dry greenware has been proven to be critical to firing success, a long hot, dry weather window is needed for firing. In the Four Corners area such weather is predictable and dependable on the summer solstice. Anasazi calendars repeatedly show the summer solstice—an important day, perhaps for their potters.

Conclusion

The four stage experimental firing regime described reproduces a number of characteristics of the prehistoric trench kilns excavated by Brisbin in Mesa Verde National Park for the Mesa Verde Waterline Replacement Project Phase III. The primary coal bed provides the large amount of charcoal that lies under the kiln shelving and any vessels or vessel fragments left in the kiln. The secondary fuel provides the charcoal and ash that overlies the kiln shelving. The high heat of both firing stages oxidizes the kiln shelving and lining stones, and the subsequent smothering and ultimate abandonment of the kiln with charcoal in place blackens the stone surfaces, duplicating the Mesa Verde examples where the stones were black on their surfaces but showed oxidation when broken to reveal their cross section. The smothering soil provides the stratigraphic layer of sterile soil which is then intermixed with the secondary firing residue during unloading.

The range of pottery produced in these trench kiln firings has matched the archaeological record. The failures resembled closely the residual "waster" ceramics found in some kilns; the best pieces rival exquisite museum specimens. The variables involved in open kiln firings are tremendous. This regime is a basic strategy that requires experience in order to be adjusted to fit specific clays, paints, fuels, and weather. More importantly it requires further experimentation. Buried long ago in remote areas, Anasazi pottery kilns are a recent arrival on the Southwestern archeological scene and are now opening a broad field of knowledge and understanding.

Chapin Mesa Kilns Summary

The major emphasis of this chapter has been the description and interpretation of the nine prehistoric pottery firing kilns at seven archaeological sites (5MV3899, 5MV3966, 5MV3967, 5MV3969, 5MV3972, 5MV3945, 5MV3982) which were excavated on Chapin Mesa as a result of mitigation work associated with the Mesa Verde Waterline Replacement Project Phase III. Characteristics of these pottery firing kilns including kiln morphology, the firing regime, type of fuel used, and the social implications of the spatial positioning away from the habitations and near the edge of the mesa were discussed..

Kiln Morphology

Morphologically the kilns excavated at Mesa Verde National Park were typical of most kilns thus far excavated in the northern San Juan Region. They were simply trenches excavated into the substrate and in most cases lined around their edges by unmortared vertical sandstone slabs. Another almost ubiquitous aspect of the kilns was a layer of horizontally placed sandstone slabs placed across the interior of the features near, but not on, the floor. These portable stones are referred to as kiln furniture, and were used as platforms for the pottery to be fired.

A perceived outcome from the excavation of these kilns was that stylistic changes in kiln morphology, through time, would be apparent when compared with other excavated examples. All but one of the previously reported kilns had been affiliated with the Pueblo III period. Unfortunately the general morphological kiln traits from the Pueblo I period through the Pueblo III do not show any meaningful variation. One possible difference is the shelf found at one end of many of the Pueblo III kilns. This feature was not reported from any kilns earlier than that period. More data is needed before any definitive statements will be possible concerning temporally sensitive morphological kiln traits.

Kiln Stratigraphy and Firing Regime

The stratigraphy noted in the Mesa Verde kilns was the key to unlocking the prehistoric firing regime. The validity to the stratigraphic interpretations has been amply demonstrated by numerous replication firings using the four stage firing regime demonstrated by this stratigraphy. The lowermost layer represents the initial firing of fuel which preheats the kiln and drives off any residual moisture. The bed of coals left over from the primary firing also supplies additional heat during the secondary firing. The two heat sources combined create the 800 to 900 degree centigrade temperatures necessary for a successful firing. This extreme temperature must be sustained for between 15 to 30 minutes for a firing to be successful.

The next step after the primary fuel has burned down to a bed of flameless coals is the placement of the kiln furniture and on top of these stones, the greenware vessels. Whether the application of cover sherds around and over the greenware at this time is necessary or not is still an open question. Most replicators as well as the author agree that they are. After the setting of kiln furniture, unfired pottery vessels and cover sherds the third step is implemented. This step is the placement of the secondary fuel. The best results for this process have been gained by crossing the kiln with large pieces of fuel called spanners. The interstices between the spanners are closed using smaller pieces of fuel until a pile of loosely cribbed fuel is produced that is as high as the kiln is deep. Finally this fuel is ignited from the top and allowed to burn down to a layer of ash and coals which completely cover the pottery. It is the control of this secondary firing which determines, more than any other factor, the final success or failure of the firing. The final step to the process is covering the entire kiln with a fairly deep lens of clean earth (15 to 20 cm deep). If all goes well then in 18 to 24 hours the internal temperature will have cooled to a point where the pottery can be comfortably removed.

Kiln Fuel

The fuel preference noted for the Mesa Verde kilns was without a doubt pinyon/juniper wood. The question of fuel preference was one of the prime research questions from the very beginning of our excavations. This study puts to rest once and for all the many speculative reasons posed for the isolated nature of the kilns away from the habitation sites. One of the reasons proposed was that the good fuels in and around the habitation sites had been depleted thus the kilns were moved out to more marginal lands where bushier fuel could be found in abundance. Only traces of brushy species were found in our kilns while the preponderance of fuel in all cultural levels was pinyon/juniper.

Kiln Chronology

With one exception, the nine kilns excavated at Mesa Verde National Park for the Mesa Verde Waterline Replacement Project Phase III were the earliest kilns yet excavated in the Mesa Verde Region. The exception is a kiln excavated by La Plata Archaeology in 1984 which dated to the Pueblo I Period. Other kilns excavated and reported all date to the Pueblo III period. The Mesa Verde kilns, dated by ceramic typological cross dating and tree-ring dates all fall into the Pueblo II time frame and date between A.D. 900 and 1100.

Material Culture in Kilns

Material culture found within the Mesa Verde kilns was sparse. Ceramic sherds, and in one case, two miniature ladles completed the inventory. The ceramics which were found were either highly fragmented, burned and warped, oxidized or as in most cases all of the above. These sherds were from different vessels and vessel forms and may represent reused cover sherds rather than whole pieces broken during the firing.

Faunal Remains in Kiln Deposits

The highly ground bone fragments recovered from the secondary firing stratum in most of the kilns seems to be the result of patterned behavior, however the reason for the introduction of this bone into the secondary firing remains a mystery.

Kiln Size and Associated Social Organization

Three size categories were defined for the Chapin Mesa kilns. In general these were small, medium, and large. Two different scenarios were presented to account for these different size grades. The first suggested that the kilns were used and owned by individual household groups and were used by these people for making replacement pottery for themselves. The second scenario and the one which seems to have the greatest validity is that the kilns were built, used, and maintained by entire communities. The different size categorizes could then represent kilns used for everyday domestic manufacture as well as kilns used to create a surplus for either intra- or extra-community trade. The length and width of the kilns proved to be the most fluid characteristics especially in regards to length. The width of the kilns compares favorably with an individual's arm length from one edge to the center regardless of the length of the feature. Therefore, the length of a kiln probably reflects its intended purpose in the mind of the builder(s), whereas the width is prescribed by common sense. The depth of kilns on the other hand, seems to be patterned behavior and relates to the technical aspects of proper firing procedure. Once the kiln furniture is in place on top of the primary fuel layer the average 40 cm depth of a kiln has been reduced to a 25 cm band. This band extends from the top of the kiln furniture to the top of the slab lining. For the best results all of the pottery to be fired must fall within this 25 cm zone. Experimental firings have shown that pottery extending above the tops of the lining slabs invariably comes out poorly.

Kiln Locations

The final aspect of kilns to be summarized concerns their spatial positioning on the landscape. The reasons for this were both technical and social. The technical reasons had to do with utilizing the predictable up and down canyon winds created by the sun's effects on the earth. The orientation of the kilns across shallow drainages and perpendicular to them were all practical methods for increasing oxygen flow across the kiln. This increased oxygen flow in turn would help achieve the high temperatures needed for a successful firing. The social hypothesis suggests that the kilns come in loosely organized clusters and that these clusters are communal property rather than owned by individual households or household groups. It was argued that pottery firing, as an intra community event has many advantages over firings being performed by smaller social groups. A pottery firing is an excellent medium for social interaction and integration if the replica firings I have attended are any example. Kiln firings just by their very nature consume vast quantities of wood. The procurement of that wood is labor intensive, and would be a major effort for a single family or even two families. On the other hand if kiln firings were a communal event then the participants, as part of their participatory duties, could be required to supply a certain volume which would be acquired in areas away from the kiln sites. A practice such as this would greatly alleviate the impact to fuel sources near the kilns themselves. This social scenario is fits well with the type of social framework which exists among the Pueblo peoples today.

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CHAPTER 11

MESA VERDE WATERLINE REPLACEMENT PROJECT PHASE III

SUMMARY AND CONCLUSIONS

The Mesa Verde Waterline Replacement Project Phase III, 1992-1997, provided an opportunity to investigate human land use and settlement patterns through time in the Colorado Plateau region of southwest Colorado. A total of 43 ha was surveyed for cultural resources along the 63 km route of the waterline across three different ecological zones: lower montane foothill, river valley floor, and mesa top. A total of 47 sites was discovered during the construction of the waterline replacement and effects of construction work were mitigated on 30 sites by testing and excavation. Overall the cultural resources discovered ranged in time from the late Archaic Period (ca. 1000 B.C.-300 B.C.) through the Anasazi occupation (A.D. 1-1300) through the Euro-American historic period (A.D. 1600-1950). The sites reflected a wide range of land use including small campsite fire pits, pottery firing kilns, mountain resource procurement sites, prehistoric horticultural habitation sites, historic homesteads, trails, historic railroads, and federal park development.

One of the most significant contributions to our understanding of the past was through the excavation and analysis of nine Anasazi pottery firing kilns at seven sites on Chapin Mesa within Mesa Verde National Park. The kilns were the first Pueblo II trench kilns excavated in the Mesa Verde Region. The stratigraphic deposits indicated a four stage firing process for Anasazi pottery and the fuel used in the firing was identified as primarily pinyon and juniper.

Water has always been a limiting factor for human survival on the Colorado Plateau. In Mesa Verde National Park providing water for Park administration and visitor needs has been a serious concern since 1906 when the Park was established. Park personnel devised various strategies to provide water: building large collecting basins, drilling deep water wells, and finally constructing the 63 km water pipeline from the West Mancos River. The Mesa Verde Waterline Replacement Project Phase III included replacement of pipeline sections in Mesa Verde National Park in Morefield Campground, Far View, the Park Entrance, and on Chapin Mesa. Additional sections of the waterline were replaced north and west of the North Escarpment of Mesa Verde in the Montezuma Valley and in the area of Chicken Creek north of Mancos, Colorado.

Historic studies associated with the project included attention to the relevant historic contexts for southwest Colorado: Spanish Exploration; Fur Trade and American Exploration; the Early Gold Rush; the Railroads; Ranching, Farming, Water, and Irrigation; Federal Activity (Development of Mesa Verde National Park); The Establishment of Early NPS Administrative Facilities in Mesa Verde National Park 1921-1931; Depression Era Development at Mesa Verde National Park 1931-1942. Effects to seven historic districts identified in Mesa Verde National Park were mitigated: 5MT9790 (Mesa Verde Administrative District), 5MV3938 and 5MV3939 (Civilian Conservation Corps Campground), 5MV3941 (Civilian Conservation Corps Campground), 5MV3990 (Utility Area), 5MV3991 (Residential Area), 5MV3992 (Navajo Hogan Area).

The project area was divided conceptually into the Mancos Segment, the Montezuma Valley Segment, and the Mesa Verde Segment. Elevations from east to west ranged from 2524 m at the West Mancos River down into the Mancos and Montezuma Valleys (1921 m), up and over the North Rim of Mesa Verde (2462 m), and on to Chapin Mesa (2157 m). Native floral and faunal resources were available in the region including large and small mammals, seeds, berries, roots, and medicinal plants for food and fiber. Local lithic and clay resources were available for the making of stone tools and pottery. The climate was marginal for dryland farming in that a slight change could have a great effect on human populations.

In the Mancos Segment lower montane foothill region, 12 sites were discovered and effects to five sites were mitigated. It appears that in the Mancos Segment the settlement pattern was one of prehistoric procurement sites in the uplands and historic homesteads. The Rio Grande Southern Railroad, a major transportation link, crossed the area.

In the Montezuma Valley Segment, valley floor area, 20 sites were discovered and effects to 12 sites were mitigated. Of these, 5MT10594, a transitional Basketmaker III-Pueblo I, site was totally excavated.

There was sparse occupation by Archaic and Basketmaker II populations with an increase in site density by Basketmaker III-Pueblo II. It appears that known Pueblo III sites were confined to the base of the north escarpment of Mesa Verde. Historic sites included homesteads, camps, and trails through the valley and over the north escarpment to Mesa Verde.

In Mesa Verde National Park, on the mesa top, 15 sites were discovered and effects to 13 others were mitigated. New discoveries of Archaic and Basketmaker II procurement sites in the Park Entrance area deepened our knowledge of prehistory. Basketmaker III sites are located toward the interior of the mesa and along the ridge lines where deep soil is present. Population expansion is evident in Pueblo I times with locations in the same good farming areas. There is an even greater expansion of population evident in the Pueblo II time period with sites tending to be more clustered in the southern end of the Park where the mesa top is broader. Prehistoric pottery firing kilns of the Pueblo II time period were also found on the mesa top. Pueblo II sites also cluster in an around Morefield Campground. Pueblo III sites reflect a locational shift in settlement pattern from the mesa tops to the alcoves, talus slopes and mesa edges. Historic sites in the Park reflect not only Park development and construction using contract labor but also early homesteading in the Park area.

In general, human land use in the Mesa Verde Waterline Replacement Project study area changed over time from hunting and gathering of wild natural resources; to prehistoric horticulture; to historic farming, ranching, and mining; to recreation and preservation of natural and cultural resources.

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Appendix A
Summary of Soil Mapping Units within Project Area

Soil Mapping Unit	M a	M t x	M Y	Soil Depth (cm)	Slope & Landform	Parent Material	Source	Plant	Elev. (m)	Precip. (cm)	Frost Free Days	Land Use
AOAB Lillings--silt, Sodic	X	X		Deep 154	1-3% Fans Terraces	Alluvium		SA?? CHNA ALSA GUSA	1646- 2256	28-38	100- 135	Grazing Wildlife Hab. Homesite Dev. Irrig. Crops
AOB		X										
AOC Lillings--silty Clay Loam				Deep 154	3-6% Fans Terraces	Alluvium		SA?? CHNA ALSA GUSA	1646- 2256	28-38	100- 135	Grazing Wildlife Hab Homesite Dev. Irrig. Crops
A2B Sideshow--silty Clay Loam	X	X		Deep 60+	0-3% Fans Terraces	Alluvium	MS	ARTR CHNA SA?? A.W.	1646- 2256	28-38	100- 135	Crops Pasture Grazing Homesite Dev.
A4 Ramper--loam	X	X		Very deep 154+	0-3% Fans Terraces	Alluvium	MS	ARTR CHNA GALL BRTE	1646- 2256	28-38	100- 135	Grazing Crops Homesite Dev Wildlife Hab.
A5C Sideshow--silty Clay Loam		X		Deep 154+	3-6% Hillsides Fans	Alluvium	MS	ARTR CHNA AGSM A.W.	1646- 2256	28-38	100- 135	Crops(irrig. & Nonirrig.) Grazing Pasture Homesite Dev.
A5D Sideshow--silty Clay Loam	X	X		Deep 154+	6-12% Hillsides Fans	Alluvium	MS	ARTR CHNA AGSM A.W.	1646- 2256	28-38	100- 120	Crops(irrig. & Nonirrig.) Grazing Pasture Homesite Dev
BD Torriorthents (55%)-badland (30%) Complex				Shallow to Deep 26-154 cm	25-100% Escarpment Canyon & Mountain Sidesplopes	Colluvium, Residuum, Residuum,	Ss. Sh. Sh	85% + UV	1524- 2256	20-38	100- 160	Wildlife Hab.
C2D Zigzag--clay Loam, Dry		X			3-12% Knobs Ridges Hillslopes	Residuum & Colluvium	MS	GALL ORHY AGSM ARTR	1646- 1890	28-33	120- 135	Grazing Wildlife Hab. Homesite Dev Irrig. Crops

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Soil Mapping Units (cont.)

Soil Mapping Unit	M a	M t z	M Y	Soil Depth (cm)	Slope & Landform	Parent Material	Source	Plant	Elev. (m)	Precip. (cm)	Frost Free Days	Land Use
C2CE Zigzag--very Channery Clay Loam	X	X		Shallow 49	3-5% Knobs Ridges Hillslopes	Channery & Gravelly Residuum & Colluvium	MS	PIED JUOS AMAL CESP ERRA ORHY	1646- 2256	28-38	100- 135	Grazing Wildlife Hab. Homesite Dev.
C2F Zigzag (60%)- Sideshow (25%) Complex		X		Shallow 49	25-65% Hillslopes Fans Knobs Ridges	Channery Residuum & Colluvium, Alluvium	MS, MS	PIED- JUOS AMAL CESP ERRA ORHY ARTR CHNA AGSM	1646- 2256	28-38	100- 135	Gazing Wildlife Hab. Homesite Dev. Woodland
C3CD Iles--loam (Moist)	X			Very Deep 154	3-12% Hillsides Uplands	Reworked Eolian, Alluvium	Mx	PIPO QUGA BG JG BGR	2165- 2591	38-51	80- 100	Pasture Grazing Wildlife Hab. Hoesite Dev. Crops
C7D Sideshow(45 %)- zigzag(40%) Complex		X		Deep 154+	3-25% Hillslopes Fans Knobs Ridges	Alluvium, Channery & Gravelly Residuum & Colluvium	MS, MS	ARTR CHNA AGSM PIED- JUOS AMAL CESP ERRA ORHY	1646- 2256	28-38	100 135	Grazing Wildlife Hab. Homesite Dev. Woodland Crops Pasture
H1CD Sideshow-- clay Loam (Bedrock)		X		Deep 102+ cm	3-12% Hillsides Fans	Alluvium	MS	ARTR CHNA AGSM A.W.	1646- 2256	28-38	100- 135	Crops(irrig. & Nonirrig.) Grazing Pasture Homesite Dev. Wildlife Hab.
H1CL		X										
H5E		X										
H4D Northrim cobbly loam			X	Very deep	15-40% Hillsides Canyons Ridges	Colluvium	SS SH	QUGA AMAL Snow MIGR	2378- 2530	17-22	<100	Wildlife Hab. Woodland Recreation
H6D Waugue--very Sandy Loam		X		Deep 154+	6-25% Fans Hillsides	, Gravelly, Cobbly & Stony Alluvium & Colluvium	Mx		1646- 2256	28-38	100- 135	Wildlife Habitat Recreation Watershed Esthetic

Soil Mapping Units (cont.)

Soil Mapping Unit	M a	M t z	M V	Soil Depth (cm)	Slope & Landform	Parent Material	Source	Plant	Elev. (m)	Precip. (cm)	Frost Free Days	Land Use
1MC Arabrab (45%) - Longburn (35%) Complex			X	Shallow 41	3-15% Mesas Hillslopes	Colluvium, Residuum, Colluvium, Residuum	SS, Sh, SS, Sh	PIED- JUOS	2073- 2378	40-49	130- 150	National Park
1MD Longburn (65%) -Rock Outcrop (20%) Complex			X	Shallow 46	10-45% Mesas Hilslopes	Residuum, Colluvium, Residuum	SS, Sh, SS	PIED- JUOS	2073- 2378	41-49	130- 150	National Park
1ME Longburn (45%) -Rock Outcrop (35%) Complex			X	Shallow 46	45-80% Sideslopes	Residuum, Colluvium, Residuum	SS, Sh, SS	PIED- JUOS	2073- 2378	41-49	140- 170	National Park
3ME Durango (65%)- Dolcan(20%) Complex			X	Very deep 154	25-60% Canyons Hillslopes Fans Benches	Colluvium Alluvium, Colluvium Residuum	SS, Sh, Sh	PIED- JUOS	2073- 2378	41-49	130- 150	National Park
5MC Hesperus-- Sandy Loam			X	Very deep 154	3-12% Alluvial Fans Drainages	Alluvium	SS, Sh	MIGR	2134- 2439	41-46	80- 100	National Park
M1CD Falcon gravelly fine sandy loam				Shallow 33	3-25% Hillslopes Ridges	Colluvium Residuum	SS	PIPO QUGA	2164- 2591	38-51	80- 100	Wildlife Hab. Grazing
M2C1 Wauque (45%)- Dolcan(40%) Complex			X	Very deep 154/ Shallow	6-25% Canyons Hillslopes Fans	Colluvium Alluvium, Colluvium Residuum	SS, Sh, SS Sh	PIED- JUOS	1890- 2256	33-41	100- 120	Wildlife Hab. Grazing
M2CE1 Wauque (40%)- Dolcan(30%) Rock Outcrop (15%) Complex			X	Very deep 154/ Shallow	25-80% Canyons Hillslopes Fans	Colluvium Colluvium Residuum	SS, Sh, SS Sh	PIED- JUOS CESP CRHY	1890- 2256	33-41	100- 120	Wildlife Hab.

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Soil Mapping Units (cont.)

Soil Mapping Unit	Ma	Mtz	MV	Soil Depth (cm)	Slope & Landform	Parent Material	Source	Plant	Elev. (m)	Precip. (cm)	Frost Free Days	Land Use
M2DD Gladel-ulpit Complex	X	X		Shallow 38	3-9% Mesa Tops Uplands Ridges Hillsides	Cobbly Residuum, Reworked Eolian, Eolian & Reworked Eolian		PIED JUOS ARTR CHNA AMAL ORHY	1890- 2256	33-38	100- 120	Wildlife Hab. Recreation Watershed Firewood Production Esthetic
M6D		X										
1RB Morefield--silt Loam	X			Very deep 154	1-3% Mesas	Eolian	SS	PIED- JUOS	2073- 2378	41-49	130- 150	National Park
1RC Morefield--silt Loam			X	Very deep 154 cm	3-6% Mesas	Eolian	SS	PIED- JUOS	2073- 2378	41-49	130- 150	National Park
3RB Roubideau-- Loam			X	Mod deep	1-6% Mesas	Eolian	SS	PIED- JUOS	2073- 2378	41-49	130- 150	National Park
4RC Bete (60%)- Trag (25%) Complex			X	Shallow /Very deep	3-9% Uplands Hiullslopes Ridges	Residuum Eolian, Eolian	SS, SS	PIPO QUGA	2439- 2591	38-51	80- 100	National Park
R0LC		X										
R1HB Ricot--loam (Rocky Soil)	X			Deep 154	1-3% Uplands Hillsides Mesa Tops	Eolian over Stony Glacio- fluvial		PIPO QUGA AMAL JG	2165- 2591	38-51	75- 120	Grazing Pasture Wildlife Hab.
R1HC Ricot--loam	X			Deep 154	3-6% Uplands Hillsides Mesa Tops	Eolian, Stony Glacio- fluvial		PIPO AMAL JG QUGA	2165- 2591	38-51	75- 120	Grazing Pasture Wildlife Hab.
R4C		X										
R3D Cahona--very Fine Sandy Loam		X		Deep 154+	6-12% Hillslopes Uplands Mesa Tops	Eolian Reworked Eolian	Sed Rocks	PIED- JUOS ARTR AGSM MG	6200- 7400'	33-38	100- 120	Crops Pasture Grazing Homesite Dev.
R4D Sharps Loam (40%)- Cahona (40%) complex		X		Deep 154	6-12% Uplands Hillsides Mesa Tops	& Reworked Eolian		PIED- JUOS ARTR AGSM MG	6200- 7400	33-38	100- 120	Crops Pasture Grazing Homesite Dev.

Soil Mapping Units (cont.)

Soil Mapping Unit	M a	M t z	M V	Soil Depth (cm)	Slope & Landform	Parent Material	Source	Plant	Elev. (m)	Precip. (cm)	Frost Free Days	Land Use
S51 Acree--loam	X			Deep 154	2-6% Uplands Drainages Hillsides	Eolian, Reworked Eolian	Sed. Rocks	ARTR QUGA AMAL JG PIPO	2165- 2591	38-51	75- 100	Grazing Non-irrig. Crops
S6E Pramiss--very cobbly loam				Mod. Deep 79	6-25% Hillslopes Ridges	Colluvium Residuum Eolian	SS SH	PIPO QUGA	2165- 2591	38-51	80- 100	Grazing Wildlife Hab.
V1C Hesperus loam		X		Very Deep 154	3-6% Fans Benches Drainages	Alluvium	SS, Sh	FEAZ BG MMLy	2164- 2591	38-51	80- 100	Grazing Wildlife Hab.
V3C Mikum Loam		X		Deep 154	3-6% Fans	Alluvium	SS, Sh	ARTR CHNA GALL ALSA	1646- 2256	28-38	100- 135	Irrigated Cropland Grazing Homesites
V4C Fughes--loam	X			Deep 154	2-9% Upland- Terraces Drainages	Non- Alluvium	Mx	ARTR Bottleb rush Sauirre ltail BG AGSM	2165- 2591	38-51	75- 120	Grazing Wildlife Hab. Non-irrig. Crops Hay Pasture
XH2E			X									
XH3E Sheek(40%)- Archuleta- Rock Outcrop (25%) Complex			X	Deep 154	25-80% Hillsides Mountain Canyon Sideslope	Non- Colluvium & Residuum	SS, Sh	PIPO PSME QUGA MML Y FEAZ JG	2164- 2591	38-51	75- 120	Woodland Wildlife Hab. Recreation National Park
Z Ustic Torriorthents (45%)- Gullies (40%) Land Complex-- clay/loam		X		Shallow to Deep 26- 154+	25-60% Alluvial Fans, Drainage- ways,flood Plains, Terraces, Escarpments	Alluvium & Colluvium, V and U Shaped Channels	Sed. Rocks	??	1646- 2256	28-38	100- 135	Wildlife Habitat
511 Acree & Moist Fughes	X			Very deep 154	0-15% Hillslopes Uplands Fans Drainages	Alluvium, Eolian, Reworked Eolian	SS, Sh	PIPO QUGA	2165- 2591	38-51	<100	Timber Prod. Grazing Wildlife Hab.

Soil Mapping Units (cont.)

Soil Mapping Unit	M a	M t z	M Y	Soil Depth (cm)	Slope & Landform	Parent Material	Source	Plant	Elev. (m)	Precip. (cm)	Frost Free Days	Land Use
508 Herm-pagoda Complex	X			Very deep 154+	0-15% Upland-Plains Benches	Residuum, Alluvium	SS, Sh	PIPO FEAZ QUGA AMAL Snowberry	2378-2500	41-54	85-100	Timber Prod. Grazing Wildlife Hab.
T5E Herm	X			Very deep 154	15-40% Hillslopes	Eolian, Reworked Eolian over Alluvium & Colluvium	Sh	PIPO QUGA PIED Pine JUOS	7200-7800'	43-51	<100	Grazing Wildelife Hab.
058 Fughes(50%)-herm(35%) Complex	X			Very deep 154+	5-25% Uplands Terraces Hillsides Drainages	Alluvium, Eolian, Colluvium, Residuum	Mx, SS, Sh	PIPO QUGA	2165-2591	38-51	80-100	Grazing

A.W.		Miscellaneous Annual Weeds	MG	Poa fendleriana	Muttongrass
GUSA	Gutierrezia sarothrae	Snakeweed	AMAL	Amelanchier alnifolia	Serviceberry
ARTR	Artemesia tridentata	Big sagebrush	PIPO	Pinus ponderosa	Ponderosa Pine
BRTE	Bromus tectorum	Cheatgrass[a]	JG	Koeleria cristata	Junegrass
ORHY	Oryzopsis hymenoides	Indian rice grass	ALSA	Puccinellia sp.	Alkali sacaton
JUOS	Juniperus osteosperma	Utah juniper	CESP	Cercocarpus spp.	Mountain mohaogany
PIED	Pinus edulus	Pinyon pine	MIGR		Mixed Grasses
AGSM	Agropyron smithii	Western wheatgrass	GALL	Hilaria jamesii	Galleta
ERRA	Erigonum racemosum	Pinyon buckwheat	BG	Poa sp.	Bluegrass
QUGA	Quercus gambelii	Gambel oak	BGR	Bouteloua gracilis	Blue Grama
SIHY	Sitanion hystrix	Squirreltail	PSME	Pseudotsuga menziesii	Douglas Fir
SA??	Sarcobatus spp.	Greasewood	FEAZ	Festuca arizonica	Arizona Fescue
CHNA	Chrysothamnus nauseosus	Rubber rabitbrush	MMLY	Muhlenbergia montana	Mountain muhly

Appendix B
Cultural Resource Data Base of Archeological Sites Previously Recorded within the Survey Area

Table B.1. Cultural Resources Previously Recorded within the Mancos Segment

Site Number	Elevation, m (ft)	Cultural Affiliation	Site Type	Site Function
5MT4035	2170 (7120)	Historic 1890-1899	Railroad	Railroad Bed
5MT4811	2201 (7220)	Pueblo II	Lithic/Ceramic Scatter	Open Camp
5MT6044	2170 (7120)	indeterminate	Isolated Find	1 Flaked Lithic Debitage
5MT9736	2085 (6840)	Historic 1930-1939	Homestead	Farming
5MT9737	2097 (6880)	Anasazi	Lithic/Ceramic Scatter	Open Camp
5MT9738	2109 (6920)	Pueblo II-III	Isolated Find	2 Lithic Axes
5MT9739	2109 (6920)	Anasazi	Isolated Find	Axe, Hammerstone, Core
5MT9740	2115 (6940)	Anasazi	Isolated Find	2 Manos
5MT10969	2183 (7160)	Historic 1910-1930	Homestead	Farming
5MT10970	2049 (6720)	Prehistoric	Lithic Scatter	Open Camp
5MT11028	2073 (6800)	Prehistoric	Isolated Find	Retouched Flake
5MT11029	2085 (6940)	Prehistoric	Isolated Find	Utilized Flake
5MT11030	2085 (6840)	Euro-American	Isolated Find	Dump
5MT11031	2097 (6880)	Prehistoric	Isolated Find	Utilized Chopper
5MT11032+	2110 (6920)	Prehistoric	Isolated Find	Retouched Flake
5MT11033	2122 (6960)	Prehistoric	Isolated Find	2 Flakes
5MT11034*	2159 (7080)	Prehistoric	Isolated Find	1 Projectile Point
5MT11035*	2159 (7080)	Prehistoric	Isolated Find	Flake
5MT11036*	2171 (7120)	Prehistoric	Isolated Find	2 Cores
5MT11037^	2171 (7129)	Prehistoric	Isolated Find	Mano, Flake
5MT11038	2097 (6880)	Prehistoric	Isolated Find	Flake
5MT11039	2159 (7080)	Prehistoric	Isolated Find	Mano, Biface
5MT11040	2049 (6720)	Prehistoric	Isolated Find	Core

Table B.1. (cont.)

Site Number	Elevation, m (ft)	Cultural Affiliation	Site Type	Site Function
5MT11042	2046 (6710)	Prehistoric	Isolated Find	2 Flakes
5MT11043	2049 (6720)	Prehistoric	Isolated Find	Retouched Flake
5MT11044	2049 (6720)	Prehistoric	Isolated Find	Core, Flake
5MT11045	2046 (6710)	Prehistoric	Isolated Find	Mano
5MT11046	2061 (6760)	Prehistoric	Isolated Find	Battered Cobble
5MT1104[illegible]	2049 (6720)	Prehistoric	Isolated Find	Flake
5MT11049	2046 (6710)	Prehistoric	Isolated Find	Core Fragment
5MT11428	2146 (7040)	Prehistoric	Isolated Find	2-hand Mano
5MT11429	2159 (7080)	Prehistoric	Isolated Find	1-hand Mano Fragment
5MT11430	2174 (7130)	Basketmaker III/ Pueblo I	Isolated Find	Plain Grayware Sherd
Total Sites= 33				

+ = isolated find 5MT11032 was rerecorded as 5MT11793 because it was found in a different location

* = isolated find that became a part of site 5MT11732

^ = isolated find that became a part of site 5MT11797

Table B.2. Cultural Resources Previously Recorded for the Montezuma Valley Segment

Site Number	Elevation, m (ft)	Cultural Affiliation	Site Type	Site Function
5MT1926	2012 (6600)	Pueblo II	Rubble Mound	Habitation
5MT1927	2024 (6640)	Pueblo II	Rubble Mound	Habitation
5MT1928	2024 (6640)	Pueblo II-III	Rubble Mound	Habitation
5MT1929	2049 (6720)	Pueblo II-III	Rubble Mound, Midden	Habitation
5MT1930	2037 (6680)	Pueblo II	Rubble Mound	Habitation
5MT1961	2061 (6760)	Pueblo II-III	Rubble Mound, Kiva, Midden	Habitation
5MT1962	2061 (6760)	Pueblo II	Kiva	Habitation
5MT1967	2110 (6880)	Pueblo II-III	Rubble Mound, Kiva, Midden	Habitation
5MT1968	2098 (6880)	Pueblo II	Rubble Mound	Habitation
5MT1969	2085 (6840)	Pueblo II-III	Rubble Mound, Kiva	Habitation
5MT1972	1963 (6440)	Pueblo I-II	Roomblock	Habitation
5MT3719	2024 (6840)	Prehistoric	Isolated Find	Projectile Point
5MT4697	2037 (6680)	Basketmaker II-Pueblo I	Artifact Scatter	Camp
5MT5247	2146 (7040)	Anasazi	Isolated Find	Ceramics
5MT5248	2110 (6920)	Anasazi	Isolated Find	Ceramics
5MT5929	2110 (6920)	Anasazi	Isolated Find	Ceramics
5MT5681	2061 (6760)	Historic	Log House, Trash Scatter	Homestead, Brewery
5MT7277	2037 (6680)	Historic 1930-39	Tent Platform, Trash Scatter	Camp
5MT8339	1988 (6520)	Historic	Camp	Camp
5MT8340	1988 (6520)	Prehistoric	Isolated Find	Lithic Debitage
5MT8341	1988 (6520)	indeterminate	Isolated Find	Indeterminate
5MT8342	1988 (6520)	Indeterminate	Isolated Find	Indeterminate
5MT8343	1988 (6520)	Basketmaker III-Pueblo II	Isolated Find	Ceramics

Table B.2. (cont.)

Site Number	Elevation, m (ft)	Cultural Affiliation	Site Type	Site Function
5MT8334	1988 (6520)	Indeterminate	Isolated Find	Indeterminate
5MT8345	1988 (6520)	Pueblo I-II	Isolated Find	Ceramics
5MT8346	1988 (6520)	Indeterminate	Isolated Find	Indeterminate
5MT8347	1988 (6520)	Indeterminate	Isolated Find	Indeterminate
5MT8348	2095 (6870)	Prehistoric	Isolated Find	Lithic Debitage
5MT8349	2098 (6880)	Prehistoric	Isolated Find	Lithic Debitage
5MT8350	2061 (6760)	Prehistoric	Isolated Find	Lithic debitage
5MT8351	2049 (6720)	Anasazi	Isolated Find	Ceramics
5MT8352	1988 (6520)	Anasazi	Isolated Find	Lithic Debitage
5MT8604	2021 (6630)	Pueblo II	Rubble Mound, Kiva	Habitation
5MT8923	1905 (6250)	Anasazi	Isolated Find	Projectile Point
5MT8924	1909 (6260)	Pueblo II	Vertical Slab, Artifact Scatter	Seasonal Habitation
5MT8925	1902 (6240)	Basketmaker III-Pueblo I	Burned Rock, and Artifact Scatter	Habitation
5MT9104	1905(6250)	Basketmaker III-Pueblo I	Lithic, Ceramic Scatter	Habitation
5MT9105	1905 (6250)	Basketmaker III-Pueblo I	Rubble Mound, Pitstructure, Midden	Habitation
5MT9106	1905 (6250)	Basketmaker III-Pueblo I	Rubble Mound	Habitation
5MT9107	1905 (6250)	Basketmaker III-Pueblo I	Rubble Mound	Habitation
5MT9108	1904 (6245)	Pueblo I-II	Rubble Mound, Midden	Habitation
5MT9747	2061 (6760)	Pueblo II-III	Rubble Mound	Habitation
5MT9748	2085 (6840)	Pueblo II	2 Rubble Mounds	Habitation
5MT9815	2061 (6760)	Pueblo II	Rubble Mound, Kiva	Habitation
5MT10478	2058 (6750)	Pueblo II	Rubble Mound, Kiva, Midden	Habitation

Table B.2. (cont.)

Site Number	Elevation, m (ft)	Cultural Affiliation	Site Type	Site Function
5MT10479	2061 (6760)	Pueblo II-III	Rubble Mound, Kiva, Midden	Habitation
5MT10480	2060 (6758)	Pueblo II	Rubble Mound	Habitation
5MT10481	2059 (6755)	Late Pueblo II	Rubble Mound, Kiva, Midden	Habitation
5MT10482	2076 (6810)	Pueblo II	Rubble Mound	Habitation
5MT10483	2076 (6810)	Pueblo II-III	Rubble Mound, 2 Kivas	Habitation
5MT10484	2085 (6840)	Pueblo II-III	Rubble Mound, Kiva	Habitation
5MT10485	2050 (6725)	Pueblo II-III	rubble	Field House
5MT10486	2055 (6740)	Pueblo II-III	Isolated Find	Side-notched Projectile Point
5MT10487	2030 (6660)	Anasazi	Isolated Find	Hearth
5MT10488	2061 (6760)	Pueblo II-III	Rubble Mound, Kiva	Habitation
5MT10489	2076 (6810)	Pueblo II-III	2 Rubble Mounds, Kiva	Habitation
5MT10490	2091 (6860)	Pueblo III	Rubble Mound, Kiva, Midden	Habitation
5MT10594	2070 (6970)	Basketmaker III-Pueblo I	Rubble Mound, Midden, Hearths	Habitation
5MT10595	2094 (6870)	Pueblo II	Rubble Mound, Midden	Habitation
5MT10596	2021 (6630)	Anasazi	Isolated Find	Ceramics
5MT10597	2000 (6560)	Pueblo II	Lithic, Ceramic, 5 Burned Rock Clusters	Habitation
5MT10598	2067 (6780)	Basketmaker III-Pueblo I	Lithic, Ceramic, Rubble Scatter	Habitation
5MT10600	2000 (6560)	Pueblo II and Historic 1900-35	Rubble Mound, Great Kiva and Sheep Camp	Ceremonial and Ranching
5MT10801	2037 (6680)	Pueblo III	Isolated Find	3 Ceramics, 1 Lithic Debitage

Table B.2. (cont.)

Site Number	Elevation, m (ft)	Cultural Affiliation	Site Type	Site Function
5MT10802	1987 (6520)	Basketmaker III-Pueblo I	Isolated Find	2 Plain Grayware
5MT10803	1963 (6440)	Basketmaker III-Pueblo I	Isolated Find	1 Plain Grayware, 1 Tchamahia
5MT10804	1927 (6320)	Basketmaker III-Pueblo I	Isolated Find	3 Plain Grayware
5MT10805	1921 (6300)	Basketmaker III-Pueblo I	Isolated Find	1 Plain Grayware
5MT10806	1921 (6300)	Basketmaker III	Isolated Find	1 Chapin Black-on-white Bowl Sherd
5MT10807	1915 (6280)	Basketmaker III-Pueblo I	Isolated find	2 Plain Grayware
5MT10808	1915 (6280)	Basketmaker III-Pueblo I	Isolated Find	1 Grayware
5MT10809	2012 (6600)	Pueblo II	Isolated Find	5 Ceramic, 2 Lithic Debitage
5MT10810	2165 (7100)	Basketmaker III-Pueblo I	Isolated Find	4 Ceramics
5MT10811	2037 (6680)	Pueblo II-III	Lithic and Ceramic Scatter	Limited Activity Loci
5MT10812	2000 (6560)	Basketmaker III-Pueblo I	Rubble Mound, Artifact Scatter	Habitation
5MT10813	1979 (6490)	Early Pueblo II	Sandstone Concentration	Field House
5MT10814	1970 (6460)	Basketmaker III	2 Pitstructures, Artifact Scatter	Habitation
5MT10815	1921 (6300)	Basketmaker III	Lithic and Ceramic Scatter	Habitation
5MT10816	2021 (6630)	Basketmaker III and Historic	Rooms and Burned Sandstone	Habitation and Historic Corral
5MT10817	1976 (6480)	Basketmaker III	2 Rubble Mounds, 2 Pitstructures, Artifact Scatter	Habitation

Table B.2. (cont.)

Site Number	Elevation, m (ft)	Cultural Affiliation	Site Type	Site Function
5MT10818	1915 (6280)	Basketmaker III	Sandstone Slabs, Pithouse, Midden	Habitation
5MT10819	1915 (6280)	Pueblo II	Rubble Mound, Artifact scatter	Habitation
5MT10834	1997 (6550)	Basketmaker III	Lithic, Ceramic, Sandstone Scatter	Habitation
5MT10868	1985 (6510)	Basketmaker III-Pueblo I	Ceramic and Sandstone scatter	Possible Kiln
5MT11324	2061 (6760)	Pueblo II	Rubble Mound, Kiva	Habitation
5MT11325	2064 (6770)	Pueblo II	Rubble Mound, Slab Feature	Habitation
5MT11326	2070 (6790)	Pueblo II-III	Rubble Mound, Kiva, Midden	Habitation
5MT11327	2058 (6750)	Pueblo II	Roomblock, Midden	Habitation
5MT11328	2079 (6820)	Pueblo II-III	Rubble Mound, Kiva, Midden	Habitation
5MT11329	2091 (6860)	Pueblo II	Rubble Mound, Kiva	Habitation
5MT11451	2025 (6643)	Basketmaker III-Pueblo I	Rubble Mound, Depression, Midden	Habitation
5MT11452	2021 (6630)	Pueblo II	Rubble Mound	Habitation
5MT11453	2026 (6645)	Historic 1900-1917	Homestead	Farming, Ranching
5MT11454	2049 (6720)	Pueblo I	Rubble Mound, Midden	Habitation
5MT11455	2055 (6740)	Historic 1920-1970	Tent Frame, Corral, Trash Scatter	Camp
5MT11560	2037 (6680)	Prehistoric	Isolated Find	2 Lithic Debitage, 1 Scraper
5MT11561	2050 (6275)	Pueblo II	Isolated Find	10 Ceramics
5MT11562	2050 (6275	Prehistoric	Isolated Find	2 Lithic Debitage
5MT11563	2030 (6660)	Historic 1917-29	Homestead	Farming, Ranching

Table B.2. (cont.)

Site Number	Elevation, m (ft)	Cultural Affiliation	Site Type	Site Function
5MT11564	2030 (6660)	Prehistoric	Isolated Find	1 Lithic Debitage
5MT11565	1966 (6450)	Pueblo I-II	Rubble Mound	Habitation
5MT11566	2000 (6560)	Pueblo I-II	Lithic, Ceramic Scatter	Habitation
5MT11567	1977 (6485)	Anasazi	Isolated Find	1 Plain Grayware
5MT11568	1927 (6320)	Historic 1870-1934	Homestead	Farming, Ranching
5MT11569	1970 (6460)	Pueblo I-II and Recent	Rubble Mound	Habitation and Sheep Camp
5MT11660	2037 (6680)	Pueblo II	Isolated Find	1 Mancos Black-on-white Ceramic
5MT11661	2050 (6725)	Anasazi	Isolated Find	1 Corrugated Sherd
5MT11662	2049 (6720)	Anasazi	Isolated Find	1 Whiteware Ceramic
5MT11663	2030 (6660)	Anasazi	Isolated Find	1 Corrugated Sherd
5MT11664	2018 (6620)	Anasazi	Isolated Find	1 Plain Grayware
5MT11665	2000 (6560)	Basketmaker III	Lithic and Ceramic Scatter	Habitation
5MT11666	1994 (6540)	Anasazi	Isolated Find	1 Plain Grayware, 2 Lithic Debitage
5MT11667	1994 (6540)	Pueblo II	Rubble Mound, Kiva, Artifact Scatter	Habitation
5MT12048	1976 (6480)	Historic 1918-1930	Dugout, Logs, Coal Concentration, Trash Midden	Habitation
5MT12060	1951 (6400)	Prehistoric	Indeterminate	Open camp
5MT12061	1957 (6420)	Anasazi	Isolated Find	1 Plain Grayware
5MT12062	2061 (6760)	Pueblo I	Indeterminate	Habitation
5MT12063	2061 (6760	Anasazi	Isolated Find	2 Plain Grayware
Total = 118				

Table B.3. Archeological Sites Previously Recorded within the Park Entrance Area

Site Number	Cultural Affiliation	Site Type
5MV1069	Basketmaker III-Pueblo I	Rubble Mound
5MV3880	Historic	Navajo Sweat Lodge
5MV3881	Historic	Navajo Sweat Lodge
5MV3886	Pueblo II	Surface Habitation
5MV3887	Historic	Navajo Sweat Lodge
5MV3888	Historic	Trash Heap
5MV3902	Archaic	Campsite
5MV3903	Archaic	Campsite
MEVE205/50411	Archaic	Isolated Find, Core Chopper
5MV3933	Historic	Entrance Outhouse
5MV3934	Historic	Entrance Trash Dump
5MV3981	Archaic	Lithic Scatter
Residence #41	Historic, 1931	Pueblo Revival Style Architecture
Total Sites = 13	6 Prehistoric, 7 Historic	

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Table B.4 Archeological Sites Previously Recorded Within a 1.6 km Radius of Morefield Campground

Site Number	Cultural Affiliation	Site Type
5MV1028	Prehistoric	Rubble Scatter and Ceramics
5MV1029	Prehistoric	1 Room, Walls, Ceramics
5MV1976	Pueblo II	Rubble Mound, Kiva, Midden
5MV1956	Prehistoric	3-6 Rooms Plus
5MV1077	Pueblo II	Rubble Mound, Midden (3 Rooms)
5MV1078	Pueblo II	Rubble Scatter, Ceramics
5MV1079	Pueblo II	L-Shaped Rubble Mound, Kiva, Midden
5MV1080	Pueblo II	Rubble Mound, Midden
5MV1081	Pueblo II	Rubble Mound, Midden (6 Rooms Plus)
5MV1082	Pueblo II	Rubble Mound, Kiva, Midden
5MV1083	Pueblo II	L-Shaped Rubble Mound, Kiva, Midden
5MV1084	Early Pueblo II	Rubble Mound, Lithics, Ceramics
5MV1085	Pueblo II	Talus Rubble Mound, Kiva, Midden
5MV1086	Pueblo II	Hilltop Kiva, Isolated Above-Ground
5MV1087	Pueblo II	Talus Rubble Mound
5MV1088	Late Pueblo II-Early Pueblo III	Rubble mound, Midden, (17 Rooms, 1 Kivas)
5MV1090	Pueblo II	2 Rooms and Artifact Scatter
5MV1091	Pueblo II	Gila Pueblo #80, Rubble Mound, Kiva, Midden (15 Rooms Plus)
5MV1919	Pueblo II	Talus Retaining Wall, Ceramics
5MV1920	Prehistoric	Talus Retaining Wall, 3 Lithics
5MV1924	Early Pueblo II-Late Pueblo III	Rubble Mound, Kiva, 1-2 Rooms
5MV2677	Pueblo II	Rubble Mound, Midden
5MV2678	Pueblo II	Rubble Mound, Lithics, Ceramic, Pecked Water Basin

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Table B.4. (cont.)

Site Number	Cultural Affiliation	Site Type
5MV2679	Pueblo II-III	Rubble Mound, Kiva, Midden (7 Rooms Plus), 2 Pecked Water Basins
5MV2690	Pueblo II	Rubble Mound, Tower, Lithics and Ceramics, 2 Rooms
5MV2693	Pueblo II-III	Rubble Mound, Kiva, Retaining Walls
5MV2719	Prehistoric	Cliff Storage Room
5MV2720	Pueblo II	Lithic and Ceramic Scatter
5MV2721	Pueblo II-III	Rubble Scatter, Lithics, Ceramics
5MV3780	Pueblo II	Lithic and Ceramic Scatter
5MV3850	Pueblo II	L-shaped Wall Alignment, Ceramics
5MV3891	Historic Navajo	Sweat Lodge
5MV3892	Pueblo III	Cliff Storage Room
5MV3893	Historic	Prater Reservoir Earth Dam
Total = 34		

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Table B.5. Archeological Sites Previously Recorded Within a 1.6 km Radius of Navajo Hill-Far View

Site Number	Cultural Affiliation	Site Type
5MV31	Pueblo II-III	Gila Pueblo #5, Rubble Mound, Kiva, Midden
5MV32	Pueblo I	Rubble Mound, Ceramics
5MV33	Basketmaker III-Pueblo I	Upright Slabs
5MV34	Pueblo II-III	Gila Pueblo #34, Soda Canyon Pueblo, 45 Rooms, 5 Kivas, 1 Tower
5MV540	Pueblo III	2 Room Cliff Dwelling
5MV844	Prehistoric	40 Check Dams
5MV877	Prehistoric	17 Check Dams
5MV878	Prehistoric	17 Check Dams and Terraces
5MV879	Prehistoric	Shrine
5MV880	Pueblo II-III	Field House (1 Room) , Ceramics
5MV881	Pueblo III	Rubble Mound, Kiva, Midden, 7 rooms
5MV882	Pueblo II	Rubble Mound, Midden
5MV883	Pueblo II	Rubble Mound, 2-3 Rooms
5MV885	Pueblo II	3 Rooms, Kiva, Tower
5MV887	Prehistoric	Circular Structure
5MV888	Pueblo II	Rubble Mound, 2 Kivas, Midden
5MV889	Prehistoric	Rubble Mound, Ceramics
5MV892	Pueblo III	Rubble Mound, Midden
5MV893	Pueblo III	Rubble Mound, Midden
5MV894	Pueblo II	Rubble Mound, Midden
5MV895	Pueblo II	Rubble Mound, Midden
5MV896	Pueblo II	Rubble Mound, Midden, 10 Rooms
5MV897	Pueblo II	Gila Pueblo #35, Rubble Mound, Kiva, Midden, 8-10 Rooms
5MV898	Pueblo II-III	Gila Pueblo #36, Rubble Mound, Tower, Midden
5MV899	Pueblo II	Rubble Mound, Midden
5MV901	Prehistoric	10 Terraces

Table B.5. (cont.)

Site Number	Cultural Affiliation	Site Type
5MV902	Pueblo II	Rubble Mound, Kiva, Midden
5MV903	Pueblo II	Rubble Mound, Midden
5MV904	Pueblo II	Rubble Mound, Midden
5MV905	Pueblo II	Rubble Mound, Refuse
5MV906	Pueblo III	Rubble Mound, 2 Kivas, Tower
5MV907	Pueblo II-III	1 Rubble Mounds, 5 Kivas, Tower, Refuse
5MV908	Pueblo II	Rubble Mound, Kiva, Refuse
5MV910	Pueblo III	Rubble Mound, Kiva, Midden
5MV911	Pueblo II	Rubble Mound, Midden, 6 Rooms
5MV912	Pueblo II-III	Rubble Mound, Midden, 10 Rooms
5MV913	Pueblo II	L-Shaped Rubble Mound, Kiva, 7 Rooms
5MV914	Pueblo II	Rubble Mound, Kiva, Midden, 12 Rooms
5MV915	Pueblo III	Rubble Mound, Midden
5MV916	Historic Navajo	Sweat Lodge, Burned Rock
5MV917	Pueblo II	Rubble Mound, Refuse
5MV919	Prehistoric	Rubble Mound, Refuse, 2 Rooms
5MV920	Prehistoric	Rubble Mound, Kiva, Refuse
5MV921	Prehistoric	3 Terraces
5MV922	Prehistoric	Rubble Mound, 6-8 Rooms, Kiva, Refuse
5MV928	Prehistoric	8 Terraces
5MV929	Prehistoric	5 Terraces
5MV1031	Pueblo II	Rectangular Tri-wall Structure
5MV1072	Pueblo III	Rubble Mound
5MV1092	Pueblo II	Rubble Mound, Kiva, Midden, 10 Rooms
5MV1093	Pueblo II	Rubble Mound, Kiva, Midden
5MV1094	Pueblo II	Rubble Mound, Kiva, Midden
5MV1096	Pueblo II-III	Field House

Table B.5. (cont.)

Site Number	Cultural Affiliation	Site Type
5MV1097	Pueblo II	Rubble Mound, Kiva, Midden, 6 Rooms
5MV1098	Pueblo II	Rubble Mound, Midden
5MV1099	Prehistoric	Upright Slabs, 2 Rooms
5MV1907	Pueblo II	Rubble Mound, Midden, 2 Rooms
5MV1908	Pueblo III	Masonry Room (Field House)
5MV1909	Pueblo III	Rubble Mound, Ceramic Scatter, 4-6 Rooms
5MV1910	Prehistoric	Circular Structure
5MV1911	Prehistoric	Shrine
5MV1912	Pueblo II-III	Rubble Mound, Midden, 4-5 Rooms
5MV1914	Late Pueblo II-Early Pueblo III	Rubble Mound, Kiva, 16 Rooms
5MV2285	Late Pueblo II-Pueblo III	2 Rubble Mounds, Kiva, Lithics, Ceramics
5MV2288	Historic	Cistern, Earth Dams
5MV2289	Pueblo I-Early Pueblo III	Rubble Mound, Lithics, Ceramics
5MV2290	Pueblo II	Rubble Mound
5MV2291	Historic Navajo	Stone circle
5MV2293	Prehistoric	Field House, Rubble Mound, 2 Check Dams
5MV2294	Prehistoric	2 Check Dams
5MV2295	Pueblo II	Rubble Mound, Lithics, Ceramics
5MV2296	Historic	Earth Dam, Reservoir
5MV2297	Prehistoric	4 Check Dams
5MV2298	Pueblo II-Early Pueblo III	Rubble Mound, Lithics, Ceramics, Axe Grooves
5MV2301	Pueblo II-III	Terrace/Retaining Wall, Lithics, Ceramics
5MV2302	Pueblo II-Early Pueblo III	Rubble Mound, Lithics, Ceramics
5MV2303	Prehistoric	25 Check dams
5MV2304	Pueblo II	Rubble Mound, Lithics, Ceramics
5MV2305	Pueblo III	Rubble Scatter, Ceramics
5MV2306	Pueblo II-Early Pueblo III	Rubble Mound, Lithics, ceramics

Table B.5. (cont.)

Site Number	Cultural Affiliation	Site Type
5MV2307	Pueblo II	Rubble Mound, Lithics, Ceramics
5MV2308	Pueblo II-Early Pueblo III	rubble Mound, Lithics, Ceramics
5MV2314	Pueblo II-Early Pueblo III	Rubble Mound, Lithics, Ceramics
5MV2349	Historic Navajo	Corral
5MV2403	Pueblo II	Rubble Mound, Lithics, Ceramics
5MV2420	Prehistoric	Semi-circular Wall, Pecked Basin
5MV2422	Pueblo II	Semi-circular Wall
5MV2427	Pueblo II-III	Rubble Mound, Kiva, Lithics, Ceramics
5MV2428	Pueblo II-III	Rubble Scatter, Lithics, Ceramics, 1 Room
5MV2429	Pueblo II	Rubble Mound, Kiva, Tower
5MV2434	Indeterminate	2 Circular Mounds of Burned Rock
5MV2435	Pueblo II	Rubble Scatter, Lithics, Ceramics
5MV2437	Basketmaker III-Pueblo III	Rubble Mound, Lithics, Ceramics
5MV2438	Pueblo I-II	Wall, Rubble, Lithics, Ceramics
5MV2439	Historic	Earth Dam
5MV2440	Pueblo II	Rubble Scatter, Lithics, Ceramics
5MV2441	Pueblo II	Upright Slab, Lithics, Ceramics
5MV2442	Pueblo II	Rubble Mound, 4-5 Rooms
5MV2443	Pueblo II-Early Pueblo III	Rubble Mound, Kiva, Midden
5MV2444	Pueblo III	2 Rubble Mounds, Lithics, Ceramics
5MV2445	Pueblo II	Rubble Mound, Ceramics
5MV2446	Pueblo II-Early Pueblo III	Retaining Walls, Artifact Scatter
5MV2447	Indeterminate	2 Rows of Burned Rock
5MV2448	Pueblo II	Rubble Scatter, Lithics
5MV2452	Pueblo II-III	Rubble Scatter, Lithics, Ceramics
5MV2456	Pueblo II	3 Rubble Piles, Ceramics
5MV2459	Indeterminate	Retaining Wall

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Table B.5. (cont.)

Site Number	Cultural Affiliation	Site Type
5MV2462	Pueblo II-III	Rubble Mound, Tower, Midden
5MV2464	Pueblo II	Interment
5MV2465	Pueblo II	Coursed Wall, Ceramics
5MV2466	Pueblo II-III	2 Rubble Mounds, Lithics, Ceramics
5MV2467	Pueblo II-III	Tower, Lithics, ceramics
5MV2468	Pueblo II-Early Pueblo III	Ceramic Scatter, Lithics
5MV2471	Pueblo II-III	Three Kiva Complex, Lithics, ceramics
5MV2480	Pueblo II-III	Rubble Mound, Midden
5MV2481	Pueblo II-III	2 Large Roomblocks, 5 Kivas, Midden
5MV2482	Pueblo II	Rubble Mound, Midden
5MV2485	Pueblo II-III	Rubble Wall, Kiva
5MV3682	Pueblo I-II	2 Rooms
5MV3684	Pueblo II	Rubble Mound, Field House
5MV3698	Pueblo III	L-Shaped Rubble Mound, Kiva, Midden
5MV3700	Pueblo II	Rubble Mound, Midden, 6 Rooms
5MV3702	Pueblo II	Rubble Mound, Midden, 4 Rooms
5MV3704	Pueblo II	Rubble Mound, Kiva, Midden
5MV3706	Pueblo II	Rubble Mound, Retaining Wall, Midden
5MV3707	Pueblo II-III	Rubble Mound, Midden
5MV3708	Pueblo III	Rubble Mound, Retaining Wall, Midden
5MV3713	Pueblo II	Rubble Mound, 8-10 Rooms, 2 Roomblocks, Midden
5MV3724	Pueblo II-III	Rubble Scatter
5MV3725	Pueblo II	Rubble Mound, Ceramics, Field House
5MV3726	Pueblo II-III	Retaining Wall, Midden
5MV3727	Pueblo II	Roomblock, Ceramics
5MV3729	Pueblo II	3 Rooms
5MV3731	Pueblo II	Rubble Mound, Midden

Table B.5. (cont.)

Site Number	Cultural Affiliation	Site Type
5MV3733	Pueblo II-III	Multiple Rubble Mounds, 2 Kivas, Midden
5MV3739	Pueblo II	Rubble Mound, Midden
5MV3741	Pueblo II	Roomblock, Midden
5MV3742	Pueblo III	Cliff Dwelling, 8 Rooms, Four Window House
5MV3745	Pueblo II-III	2 Rubble Mounds, Kiva, Cist, Midden
5MV3747	Pueblo II	Rubble Mound, Midden
5MV3748	Pueblo II	2 Roomblocks, Midden
5MV3749	Pueblo II-III	4 Rubble Mounds, 4 Kivas, Midden
5MV3750	Pueblo II	Rubble Mound, Midden
5MV3751	Pueblo II	Rubble Mound, Ceramics
5MV3752	Pueblo II	Rubble Mound, Ceramics
5MV3753	Pueblo II-III	2 Rubble Mounds, Midden
5MV3754	Pueblo II	Roomblock, 2 Rooms
5MV3755	Pueblo II	Roomblock, Midden
Total=148		

Table B.6. Archeological Sites Previously Recorded Within a 1.6 km Radius of Chapin Mesa from the Million Gallon Tank to Park Headquarters

Site Number	Cultural Affiliation	Site Type
5MV52	Pueblo III	"Luebbens Dig" 2 Roomblocks
5MV53	Pueblo II	Rubble Mound, Midden
5MV54	Pueblo II	3 Rubble Mounds, Refuse, Gila Pueblo #19
5MV55	Pueblo III	Roomblock, Ceramic Scatter
5MV56	Pueblo II	Oxidized Sandstone, Ceramic Scatter
5MV63	Pueblo I	Rubble Mound, Light Refuse
5MV64	Pueblo I	Jacal Structure, Refuse
5MV65	Basketmaker III-Pueblo I	Rubble Mound, Refuse
5MV66	Pueblo II	Rubble Mound, Light Refuse
5MV67	Pueblo I-II	Rubble Mound, Refuse
5MV73	Pueblo II	Roomblock, Light Refuse
5MV74	Early Pueblo III	Roomblock, Kiva, Light Refuse, 5 Rooms
5MV75	Early Pueblo III	Roomblock, Kiva, Light Refuse, 8 Rooms
5MV79	Pueblo III	Roomblock, Refuse, 5 Rooms
5MV80	Pueblo II	Roomblock, Midden
5MV81	Pueblo I	Rubble and Refuse Scatter
5MV82	Pueblo II	Roomblock, Kiva, Refuse, Gila Pueblo #26, 8 Rooms
5MV83	Pueblo I-II	Rubble Mound, Light Ceramic Scatter
5MV84	Pueblo I	Jacal Structure, Artifact Scatter
5MV85	Basketmaker III-Pueblo I	Oxidized Sandstone, Light Refuse
5MV86	Pueblo I-II	Oxidized Sandstone, Light Refuse
5MV87	Basketmaker III-Pueblo I	Oxidized Sandstone, Light Refuse
5MV88	Pueblo II	Rubble Mound, Light Refuse
5MV89	Pueblo II	Rubble Mound, Light Refuse
5MV90	Pueblo I	Jacal Structure, Light Refuse
5MV91	Pueblo I	Rubble Mound, light Refuse
5MV92	Basketmaker III-Pueblo I	Rubble Mound, Light Refuse

Table B.6. (cont.)

Site Number	Cultural Affiliation	Site Type
5MV93	Pueblo II	Oxidized Sandstone, Ceramic Scatter
5MV94	Pueblo II	Rubble Mound, Midden
5MV95	Pueblo I	Jacal Structure, Light Refuse
5MV96	Basketmaker III-Pueblo I	Jacal Structure, Light Refuse
5MV97	Pueblo II	Oxidized Sandstone, Light Refuse
5MV98	Pueblo II	Oxidized Sandstone, Light Refuse
5MV99	Prehistoric	Mound (ceremonial/shrine)
5MV100	Basketmaker III-Pueblo I	Rubble Mound, Light Refuse
5MV123	Pueblo II	Rubble Mound, Light Refuse
5MV124	Pueblo II	Rubble Mound, Midden, Sun Temple Ridge II
5MV125	Pueblo I-II	Roomblock, 3 Kivas, Refuse, Gila Pueblo #26, 7 Rooms
5MV126	Pueblo II	Rubble Mound, Midden, Gila Pueblo #22
5MV127	Pueblo II	Roomblock, Refuse, Gila Pueblo #25, 6 rooms
5MV128	Pueblo II	Roomblock, Kiva, Refuse, Gila Pueblo #23, 7 rooms
5MV129	Pueblo II	Masonry Structure, Refuse, 2 Rooms
5MV130	Pueblo II	Rubble Mound, Kiva, Midden
5MV131	Pueblo I	Jacal Structure, Refuse, 1 room
5MV132	Pueblo II	Roomblock, Kivas, Refuse, Gila Pueblo #21, 8 Rooms
5MV133	Pueblo II	Roomblock, Kiva, Refuse
5MV134	Prehistoric	20 Check Dams
5MV135	Pueblo II	Roomblock, Refuse, 3 Rooms
5MV136	Pueblo I-II	Rubble Mound, Light Refuse
5MV137	Pueblo I	Jacal Structure, Light Refuse, 4 Rooms
5MV138	Basketmaker III-Pueblo I	Rubble Mound, Light Refuse
5MV139	Pueblo II	Roomblock, Light Refuse, 5 Rooms
5MV140	Pueblo II	Rubble Mound, Midden
5MV141	Basketmaker III-Pueblo I	Rubble Mound, Light Refuse

Table B.6. (cont.)

Site Number	Cultural Affiliation	Site Type
5MV142	Pueblo I-II	Rubble Mound, Light Refuse
5MV143	Pueblo II	Roomblock, light Refuse
5MV144	Pueblo II	Rubble Mound, Midden
5MV145	Early Basketmaker III	2 Structures, Pithouse, Artifact Scatter, Deric's Pithouse
5MV146	Pueblo II	Rubble Mound, Light Refuse
5MV147	Pueblo I-II	Rubble Mound, Light Refuse
5MV148	Pueblo I-II	Oxidized Sandstone, Light Refuse
5MV149	Pueblo III	Roomblock, Kiva, Refuse
5MV150	Pueblo II	Rubble Mound, Refuse
5MV151	Pueblo II	Rubble Mound, Kiva, Light Refuse
5MV152	Pueblo I	Rubble Mound, Light Refuse
5MV153	Pueblo II	Rubble Mound, Refuse
5MV154	Pueblo I	Rubble and Ceramic Scatter
5MV155	Basketmaker III-Pueblo I	Rubble Mound, Light Refuse
5MV156	Pueblo II	Rubble Mound, Light Refuse
5MV157	Pueblo II	Rubble Mound, Light Refuse
5MV158	Pueblo I	Rubble Mound, Light Ceramic Scatter
5MV159	Pueblo I	Jacal Structure, Light Refuse, 3 Rooms
5MV160	Pueblo I	Rubble Mound, Light Refuse
5MV161	Basketmaker III-Pueblo I	Rubble Mound, Light Refuse
5MV162	Pueblo II	Rubble Mound, Light Refuse
5MV163	Pueblo II	Rubble Mound, Light Refuse
5MV164	Pueblo II	Rubble Mound, Midden
5MV165	Pueblo II	Rubble Mound, Midden
5MV166	Prehistoric	Check Dams
5MV167	Pueblo I-II	Rubble Mound, Light Refuse
5MV168	Pueblo II	Rubble Mound, Midden

Table B.6. (cont.)

Site Number	Cultural Affiliation	Site Type
5MV169	Pueblo I-III	2 Roomblocks, Midden, 1 Terrace, 3 Rooms
5MV170	Pueblo III	Roomblock, Midden
5MV171	Pueblo II	Rubble Mound, Light Refuse
5MV172	Pueblo II	Rubble Mound, Midden
5MV173	Pueblo I	Rubble Mound, Ceramic Scatter
5MV174	Pueblo II	Rubble Mound, Light Refuse
5MV175	Pueblo I	Jacal Structure, Light Scatter
5MV176	Pueblo I-II	Rubble Mound, Light Refuse
5MV177	Pueblo I-II	Rubble Mound, Ceramic Scatter
5MV178	Basketmaker III-Pueblo I	Rubble Mound, Light Refuse
5MV179	Pueblo II	Rubble Mound, Light Refuse
5MV180	Pueblo I	Jacal Structure, Light Refuse
5MV181	Pueblo II	Rubble Mound, Light Refuse
5MV182	Pueblo II	Rubble Mound, Light Refuse
5MV183	Pueblo II	Rubble Mound, Light Refuse
5MV184	Basketmaker III-Pueblo I	Rubble Mound, Light Refuse
5MV185	Pueblo I	Jacal Structure, Refuse
5MV186	Basketmaker III-Pueblo I	Rubble Mound, Light Refuse
5MV187	Pueblo I	Jacal Structure, Light Refuse
5MV188	Pueblo I	Rubble Mound, Light Refuse
5MV189	Pueblo II	Rubble Mound, Refuse
5MV190	Pueblo II	Rubble Mound, Light Refuse
5MV191	Pueblo II	Rubble Mound, Light Refuse
5MV192	Pueblo II	Rubble Mound, Midden
5MV193	Pueblo II-III	Roomblock, Midden, 2 Rooms
5MV194	Pueblo II	rubble Mound, Light Refuse
5MV195	Pueblo II	Rubble Mound, Light Refuse

Table B.6. (cont.)

Site Number	Cultural Affiliation	Site Type
5MV196	Pueblo II	Rubble Mound, Light Refuse
5MV197	Pueblo II	Rubble Mound, Light Refuse
5MV198	Pueblo II-III	Rubble Mound, Light Refuse
5MV199	Pueblo II	Rubble Mound, Ceramic Scatter
5MV202	Pueblo III	Rubble Mound, Light Refuse
5MV203	Pueblo III	Rubble Mound, Hearth, Light Refuse
5MV204	Pueblo III	2 Roomblocks, Tower, Terrace, Light Refuse, 3 Rooms
5MV205	Pueblo II	Rubble Mound, Light Refuse
5MV206	Pueblo II	Rubble Mound, Light Refuse
5MV207	Pueblo II	Roomblock, Light Refuse
5MV208	Pueblo II	Rubble Mound, Hearth, Light Refuse
5MV209	Pueblo I	Rubble Mound, Widely Scattered Refuse
5MV210	Pueblo II	Roomblock, Light Refuse
5MV211	Basketmaker III-Pueblo I	Rubble Mound, Refuse
5MV212	Pueblo II	Rubble Mound, Light Refuse
5MV213	Pueblo II	Rubble Mound, Light Refuse
5MV214	Pueblo I-II	Rubble Mound, Light Refuse
5MV215	Pueblo I-II	Rubble Mound, Light Refuse
5MV216	Pueblo I	Rubble Mound, Light Refuse
5MV217	Pueblo I	Rubble Mound, Light Refuse
5MV218	Pueblo I	Rubble Mound, Midden
5MV219	Basketmaker III-Pueblo I	Rubble Mound, Light Refuse
5MV220	Pueblo I	Rubble Mound, Light Refuse
5MV221	Pueblo I	Rubble Mound, Light Refuse
5MV222	Pueblo II	Rubble Mound, Light Refuse
5MV223	Basketmaker III-Pueblo I	Rubble Mound, Light Refuse
5MV224	Pueblo I	Jacal Structure, Refuse, 8 Rooms

Table B.6. (cont.)

Site Number	Cultural Affiliation	Site Type
5MV225	Pueblo I	Rubble Mound, Refuse, 3 Rooms
5MV226	Pueblo II	Roomblock, Midden
5MV227	Pueblo II	Rubble Mound, Light Refuse
5MV228	Pueblo I	Rubble Mound, Light Refuse
5MV229	Pueblo II	Roomblock, Refuse, 2 Rooms
5MV230	Pueblo II	Rubble Mound, Light Refuse
5MV231	Pueblo II	Rubble Mound, Midden
5MV232	Pueblo II	Rubble Mound, Refuse
5MV233	Pueblo I-III	2 Roomblocks, Tower, Light Refuse, 3 rooms
5MV234	Pueblo II	Roomblock, Light Refuse, 5 Rooms
5MV235	Pueblo II	Rubble Mound, Midden
5MV236	Pueblo II	Roomblock, Refuse, 2 Rooms
5MV237	Prehistoric	Oxidized Sandstone, Ceramic Scatter, Kiva
5MV238	Pueblo II	Roomblock, Light Refuse, 2 Rooms
5MV239	Pueblo II	Rubble Mound, Kiva, Light Refuse
5MV240	Pueblo I-II	Rubble Mound , Light Refuse
5MV241	Pueblo III	Rubble Mound, Light Refuse
5MV242	Pueblo I	Jacal Structure, Hearth, Refuse
5MV243	Pueblo II	Rubble Mound, Light Refuse
5MV244	Pueblo II	Rubble Mound, Refuse
5MV245	Pueblo II	Rubble Mound, Hearth, Light Refuse
5MV246	Prehistoric	11 Check Dams
5MV247	Pueblo II	Rubble Mound, Light Refuse
5MV248	Pueblo III	Rubble Mound, Light Refuse, 4 Rooms
5MV249	Pueblo I	Rubble Mound, Light Refuse
5MV250	Pueblo I	Jacal Structure, Light Refuse, 1 Room
5MV252	Pueblo II	Roomblock, Light Refuse, 6 Rooms

Table B.6. (cont.)

Site Number	Cultural Affiliation	Site Type
5MV317	Pueblo I	Rubble Mound, Light Refuse
5MV321	Basketmaker III-Pueblo I	Rubble Mound, Light Refuse
5MV322	Basketmaker III	Rubble Mound, Light Refuse
5MV323	Basketmaker III-Pueblo I	Rubble Mound, Light Refuse
5MV324	Pueblo I-II	Rubble Mound, Light Refuse
5MV325	Pueblo II-III	Roomblock, Kiva, Refuse, 20 Rooms
5MV326	Pueblo I	Roomblock, Light Refuse, 2 Rooms
5MV327	Pueblo I	Jacal Structure, Refuse, 3 rooms
5MV328	Pueblo II	Roomblock, Kiva, Refuse
5MV329	Basketmaker III-Pueblo I	Rubble Mound, Light Refuse
5MV330	Pueblo I-II	Rubble Mound, Light Refuse
5MV331	Pueblo I	Rubble Mound, Ceramic Scatter
5MV332	Pueblo I	Jacal Structure, Light Refuse
5MV333	Pueblo I	Rubble Mound, Light Refuse
5MV334	Pueblo I	Jacal Structure, Light Refuse, 3 rooms
5MV335	Pueblo II	Roomblock, Kiva, Light Refuse, 4 Rooms
5MV336	Pueblo I-II	Rubble Mound, Light Refuse
5MV337	Pueblo I-II	Jacal Structure, Refuse
5MV338	Basketmaker III-Pueblo I	Rubble Mound, Refuse
5MV339	Basketmaker III-Pueblo I	Rubble Mound, Light Refuse
5MV340	Pueblo II	Rubble Mound, Light Refuse
5MV340	Pueblo II	Rubble Mound, light Refuse
5MV341	Pueblo II	Rubble Mound, Light Refuse
5MV342	Pueblo II	Rubble Mound, Light Refuse
5MV343	pueblo I	Rubble Mound, Refuse
5MV344	Pueblo I-II	Rubble Mound, Light Refuse
5MV345	Pueblo II	Rubble Mound, Refuse

Table B.6. (cont.)

Site Number	Cultural Affiliation	Site Type
5MV346	Basketmaker III-Pueblo I	Rubble Mound, Refuse
5MV347	Pueblo II	Rubble Mound, Refuse
5MV348	Pueblo II	Rubble Mound, Refuse
5MV349	Prehistoric	Rubble Scatter, Light Refuse
5MV350	Pueblo II	Rubble Mound, Light Refuse
5MV351	Pueblo I-II	Rubble Mound, Light Refuse
5MV355	Pueblo II	Jacal Structure, Light Refuse, 2 Rooms
5MV356	Pueblo II	Rubble Mound, Light Refuse
5MV357	Basketmaker III-Pueblo I	Rubble Mound, Light Refuse
5MV358	Basketmaker III-Pueblo I	Rubble Mound, Light Refuse
5MV359	Pueblo I	Jacal Structure, Light Refuse, 8 Rooms
5MV360	Pueblo I	Rubble Mound, Light Refuse
5MV361	Pueblo I	Jacal Structure, Light Refuse, 4 Rooms
5MV362	Pueblo I	Burned Adobe, Charcoal, Sherd
5MV363	Pueblo I	Jacal Structure, Light Refuse, 2 Rooms
5MV364	Basketmaker III	Rubble Mound, Light Refuse, "Tent Area Salvage"
5MV365	Basketmaker III-Pueblo I	Rubble Mound, Light Refuse
5MV366	Prehistoric	12 Check Dams
5MV367	Pueblo II	Rubble Mound, Light Refuse
5MV368	Pueblo I	Rubble Mound, Ceramic Scatter
5MV369	Pueblo II	Rubble Mound, Kiva, Light Refuse
5MV370	Pueblo I	Jacal Structure, Pithouse, Refuse, 2 Rooms
5MV371	Pueblo I	Roomblock, Ceramic Scatter, 2 Rooms
5MV372	Pueblo II	Rubble Mound, Light Refuse
5MV373	Pueblo I	Jacal Structure, Light Refuse, 8 Rooms
5MV374	Basketmaker III-Pueblo I	Rubble Mound, Ceramic Scatter
5MV375	Basketmaker III-Pueblo I	Rubble Mound, light Refuse

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Table B.6. (cont.)

Site Number	Cultural Affiliation	Site Type
5MV376	Pueblo I	Jacal Structure, Refuse
5MV377	Pueblo I-II	Rubble Mound, Light Refuse
5MV378	Pueblo I-II	Rubble Mound, Light Refuse
5MV379	Basketmaker III-Pueblo I	Rubble Mound, Ceramic Scatter
5MV380	Basketmaker III-Pueblo I	Rubble Mound, Light Refuse
5MV381	Pueblo II	Rubble Mound, Light Refuse
5MV381	Pueblo II	Rubble Mound, Light Refuse
5MV383	Early Pueblo II	Tower
5MV384	Pueblo II	Roomblock, Kiva, Light Refuse
5MV385	Pueblo II	2 Roomblocks, Kiva, Light Refuse
5MV386	Pueblo I	Jacal Structure, Light Refuse
5MV387	Pueblo I	Jacal Structure, Ceramic Scatter, 3 Rooms
5MV388	Prehistoric	Roomblock, 1 Room, Reservoir Associated With Farview Ditch
5MV389	Pueblo I	Jacal Structure, Light Refuse
5MV390	Pueblo II	Rubble Mound, Ceramic Scatter
5MV391	Basketmaker III	Rubble Mound, Light Refuse, 1 Room
5MV394	Pueblo III	Roomblock, light Refuse, 3 rooms
5MV395	Prehistoric	62 Check Dams and Terraces, "Cliff Dweller Dams, Farm Terraces"
5MV396	Basketmaker III-Pueblo I	Rubble and Ceramic Scatter
5MV397	Pueblo III	Room, Kiva, Tower, Light Refuse, "Cedar Tree Tower"
5MV398	Pueblo I	Jacal Structure, Light Refuse
5MV399	Basketmaker III-Pueblo I	Rubble and Ceramic Scatter
5MV400	Prehistoric	Rubble Mound, Kiva, Light Refuse
5MV401	Pueblo II	Rubble Mound, Light Refuse
5MV402	Pueblo II	Rubble Mound, Light Scatter
5MV403	Pueblo II	Rubble Mound, Ceramic Scatter
5MV404	Pueblo II	Rubble Mound, Light Refuse

Table B.6. (cont.)

Site Number	Cultural Affiliation	Site Type
5MV405	Basketmaker III	2 Rooms, Pithouse, Refuse, "Pipeline Pithouse, Pithouse #1"
5MV406	Pueblo II	Rubble Mound, Light Refuse
5MV407	Prehistoric	Rubble Scatter
5MV408	Pueblo I-II	Jacal Structure, Light Refuse
5MV409	Prehistoric	Rubble Scatter, Light Refuse
5MV410	Pueblo II	Rubble Mound, Light Refuse
5MV411	Pueblo I-II	Rubble Mound, Light Refuse
5MV412	Basketmaker III	Jacal Structure, Pithouse, Light Refuse
5MV413	Pueblo I	Jacal Structure, Light Refuse
5MV414	Basketmaker III	Rubble Mound, Ceramic Scatter
5MV415	Pueblo I	Rubble Mound, Light Refuse
5MV416	Basketmaker III	Rubble and Ceramic Scatter
5MV417	Pueblo I	Jacal Structure, Light Refuse
5MV418	Prehistoric	Rubble Scatter, Light Refuse
5MV419	Pueblo I	Jacal Structure, Ceramic Scatter
5MV420	Pueblo I	Jacal Structure, Light Refuse
5MV421	Pueblo II	Rubble Mound, Light Refuse
5MV422	Prehistoric	Rubble and Ceramic Scatter
5MV423	Pueblo I	Rubble Mound, Light Refuse
5MV424	Prehistoric	Rubble and Ceramic Scatter, Pithouse
5MV425	Prehistoric	Rubble and Ceramic Scatter, Pithouse
5MV426	Pueblo II	Rubble and Ceramic Scatter
5MV427	Pueblo I	Jacal Structure, Ceramic Scatter
5MV428	Pueblo II	Rubble Mound, Kiva, Light Refuse
5MV429	Pueblo I	Jacal Structure, Ceramic Scatter
5MV430	Prehistoric	Rubble Mound, Ceramic Scatter
5MV431	Pueblo I	Rubble and Ceramic Scatter

Table B.6. (cont.)

Site Number	Cultural Affiliation	Site Type
5MV432	Basketmaker III-Pueblo I	Rubble and Ceramic Scatter
5MV433	Basketmaker III	Rubble and Ceramic Scatter, Pithouse
5MV434	Pueblo III	Roomblock, Ceramic Scatter, 1 Room
5MV435	Basketmaker III	Rubble and Ceramic Scatter, Pithouse
5MV436	Pueblo II	Rubble and Ceramic Scatter
5MV437	Basketmaker III-Pueblo I	Rubble and Ceramic Scatter
5MV438	Pueblo I	Jacal Structure, Light Refuse, 2 Rooms
5MV439	Pueblo II	Rubble and Ceramic Scatter
5MV440	Pueblo II	Roomblock, Light Refuse, 2 Rooms
5MV441	Basketmaker III-Pueblo I	Rubble Mound, Light Refuse
5MV442	Basketmaker III	Rubble Mound, Pithouse, Light Refuse
5MV443	Basketmaker III	Rubble Mound, Light Refuse
5MV444	Prehistoric	Rubble Mound and Ceramic Scatter
5MV445	Pueblo I	Jacal Structure, Refuse
5MV446	Pueblo II	Tower, Light Refuse
5MV447	Prehistoric	Rubble, Ceramic Scatter
5MV448	Pueblo II	Rubble Mound, Refuse
5MV449	Pueblo I	Jacal Structure, Light Refuse
5MV450	Pueblo I	Jacal Structure, Light Refuse
5MV451	Pueblo II	Rubble Mound, Light Refuse
5MV452	Pueblo II	Rubble Mound, Light Refuse
5MV453	Pueblo II	Rubble Mound, Refuse
5MV454	Pueblo II	Roomblock, Kiva, Light Refuse, 1 Room
5MV455	Pueblo I	Rubble Mound, Light Refuse
5MV456	Pueblo I-Early Pueblo II	Rubble Mound, Ceramic Scatter
5MV457	Prehistoric	27 Check Dams
5MV458	Pueblo II	Rubble Mound, 4-5 Rooms, Refuse

Table B.6. (cont.)

Site Number	Cultural Affiliation	Site Type
5MV459	Pueblo I	Jacal Structure, Refuse
5MV460	Pueblo II	Rubble Scatter, Refuse
5MV461	Pueblo I	Rubble and Ceramic Scatter
5MV462	Pueblo I	Rubble and Ceramic Scatter
5MV463	Pueblo II	Rubble Mound, Refuse
5MV464	Pueblo II	Roomblock, Refuse
5MV465	Pueblo II	Rubble Mound, Light Refuse
5MV466	Pueblo I	Jacal Structure, Light Refuse
5MV467	Basketmaker III	Jacal Structure, Pithouse, Light Refuse
5MV468	Pueblo II	Rubble and Ceramic Scatter
5MV469	Basketmaker III-Pueblo II	Rubble Mound, Light Refuse, Basketmaker III Pithouse
5MV470	Basketmaker III-Pueblo I	Rubble and Ceramic Scatter, Pithouse
5MV471	Pueblo II	rubble and ceramic Scatter
5MV472	Pueblo II	Rubble Scatter, Light Refuse
5MV473	Pueblo I	Rubble Mound, Light Refuse
5MV474	Pueblo I	Jacal Structure, Refuse, 15 Rooms
5MV475	Pueblo II	Rubble Mound, Light Refuse
5MV476	Pueblo I	Jacal Structure, Light Refuse
5MV477	Pueblo I	Rubble and Ceramic Scatter, Pithouse
5MV478	Pueblo I	Rubble and Ceramic Scatter, Pithouse
5MV479	Pueblo II	Rubble and Ceramic Scatter
5MV500	Pueblo II	Rubble Mound, Light Refuse
5MV505	Pueblo III	Cliff Storage, 2 Storage Rooms
5MV506	Pueblo III	Cliff Dwelling, Upper Ledge (2 Rooms), Lower Ledge (9 Rooms), Kiva, Water Seep, Petroglyph, Refuse
5MV507	Pueblo III	Cliff Dwelling, 3 Rooms, 2 Storage Rooms, Refuse
5MV508	Pueblo II-III	Roomblock, Light Refuse, 5 Rooms

Table B 6 (cont.)

Site Number	Cultural Affiliation	Site Type
5MV509	Pueblo III	Cliff Dwelling, Upper Ledge (3 Storage Rooms), Lower Ledge (10 Rooms), Square Kiva, Retaining Walls, Petroglyph, Refuse
5MV517	Pueblo III	Cliff Dwelling, 3 Rooms, 3 Storage Rooms
5MV518	Pueblo III	Cliff Dwelling, 1 Room
5MV528	Pueblo III	Cliff Dwelling, 4 rooms, Refuse, "Pine Tree House, Tree House Ruin No. 25"
5MV529	Pueblo III	Cliff Dwelling, 11 Rooms, 2 Kivas, Pictograph, Refuse, "Alcove House"
5MV530	Pueblo III	Cliff Storage, 1 Room, Historic Markings
5MV531	Pueblo III	Rubble Mound, Refuse
5MV532	Pueblo III	Cliff Dwelling, 2 Rooms
5MV533	Pueblo III	Cliff Dwelling, 2 Rooms, Kiva, Light Refuse
5MV534	Pueblo III	Cliff Dwelling, 8 Rooms, Kiva, Hand and Toe Holds, Light Refuse, "Thomas House"
5MV535	Pueblo III	Cliff Dwelling, 17 Rooms, 3 Kivas, Refuse, "Lone Pine House"
5MV363	Pueblo III	Cliff Dwelling, 2 Rooms, Refuse
5MV537	Pueblo III	Cliff Storage, 1 Room
5MV538	Basketmaker III-Pueblo III	Cliff Dwelling, 2 Rooms, Pictographs, REFUSE
5MV549	Pueblo III	Cliff Dwelling, 2 Rooms
5MV550	Pueblo III	Cliff Dwelling, 4 Rooms
5MV551	Pueblo III	Cliff Storage, 2 Rooms
5MV552	Pueblo III	Cliff Dwelling, 4 Rooms, Light Refuse
5MV553	Pueblo III	Cliff Dwelling, 3 Rooms, Retaining Wall, Refuse, "Corn Cob House"
5MV554	Pueblo III	Cliff Storage, 3 Rooms, Ceramics
5MV555	Pueblo III	Cliff Storage, 1 Room
5MV557	Pueblo III	Cliff Dwelling, 13 Rooms, 2 Kivas, Refuse, " Ruin No. 9", "Gila Pueblo #127", "Painted Kiva House"
5MV561	Pueblo III	Cliff Dwelling, 3 Rooms
5MV562	Pueblo III	Cliff Storage, 1 Room

Table B.6. (cont.)

Site Number	Cultural Affiliation	Site Type
5MV569	Pueblo III	Cliff Dwelling, 3 Rooms, Refuse
5MV570	Pueblo III	Cliff Dwelling, 3 Rooms
5MV571	Pueblo III	Cliff Storage, 1 Room
5MV572	Pueblo III	Cliff Dwelling, 5 Rooms, Kiva, Pictographs, Refuse
5MV573	Pueblo III	Cliff Dwelling, 3 Rooms, Inscription, "Oak Brush House"
5MV574	Pueblo III	Cliff Dwelling, 1 Semi-circular Room
5MV575	Pueblo III	Cliff Dwelling, 2 Rooms, Petroglyphs
5MV577	Pueblo III	Cliff Dwelling, 3 Rooms, Kiva, Pictographs, Refuse
5MV578	Pueblo III	Cliff Dwelling, 2 Rooms, Refuse, Hand and Toe Holds
5MV579	Pueblo III	Cliff Dwelling, 2 Rooms
5MV580	Pueblo III	Cliff Dwelling, 8 Rooms, Kiva, Light Refuse, Plaster Outlined 2 Story Structure
5MV581	Pueblo III	Cliff Dwelling, 4 Rooms, Kiva, 1 Storage Room
5MV582	Pueblo III	Cliff Dwelling, 6 Rooms
5MV583	Pueblo III	Cliff Dwelling, 3 Rooms, Petroglyph
5MV584	Pueblo III	Cliff Dwelling, 4 Rooms, Inscription
5MV585	Pueblo III	Cliff Dwelling, 2 Rooms
5MV586	Pueblo III	Cliff Dwelling, 3 Rooms
5MV587	Pueblo III	Cliff Dwelling, 4 Rooms, Refuse
5MV588	Pueblo III	Cliff Dwelling, 6 rooms, Storage Cist, Petroglyph, Refuse
5MV589	Pueblo III	Cliff Dwelling, 4 Rooms
5MV590	Pueblo III	Cliff Storage, 2 Rooms
5MV591	Pueblo III	Cliff Dwelling, 6 Rooms, Refuse
5MV592	Pueblo III	Cliff Dwelling, 1 Room, REFUSE
5MV593	Pueblo III	Cliff Dwelling, 1 Semi-circular Room
5MV594	Pueblo III	Cliff Dwelling, 1 Room, Kiva, Petroglyphs, Refuse
5MV595	Pueblo III	Cliff Dwelling, 2 Rooms
5MV596	Pueblo III	Cliff Dwelling, 9 Rooms, Seep, Refuse

Table B.6. (cont.)

Site Number	Cultural Affiliation	Site Type
5MV597	Pueblo III	Cliff Storage, 1 Room
5MV598	Pueblo III	Cliff Dwelling, 1 Room, Kiva, Retaining Wall
5MV599	Pueblo III	Cliff Dwelling, 4 Rooms
5MV600	Pueblo III	Cliff Dwelling, 3 Rooms, Refuse
5MV603	Pueblo III	Cliff Dwelling, 1 Room
5MV604	Pueblo III	Cliff Storage, 2 Rooms, Petroglyphs
5MV606	Pueblo III	Cliff Storage, 1 Room
5MV607	Pueblo III	Cliff Dwelling, Traces of Wall Line
5MV608	Pueblo III	Cliff Dwelling, 2 Rooms
5MV609	Pueblo III	Cliff Dwelling, 4 Rooms
5MV610	Pueblo III	Cliff Dwelling, 1 Room, Refuse
5MV640	Pueblo III	Cliff dwelling, 114 Rooms, 8 Kivas, Refuse, "Ruin No. 1, Spruce Tree House"
5MV641	Pueblo III	Cliff Storage, 9 Rooms, Seep
5MV644	Pueblo III	Cliff Storage, 1 Room
5MV649	Pueblo III	Cliff Dwelling, 1 Room
5MV651	Pueblo III	Cliff Dwelling, 1 Room
5MV652	Pueblo III	Cliff Dwelling, 1 Room, Kiva, Refuse
5MV653	Pueblo III	Cliff Dwelling, 1 Room
5MV654	Pueblo III	Cliff Dwelling, 1 Room
5MV655	Pueblo III	Cliff Dwelling, 1 Room
5MV656	Pueblo III	Cliff Dwelling, 1 Room
5MV657	Pueblo III	Cliff Dwelling, 1 Room
5MV660	Pueblo III	Cliff Dwelling, 2 Rooms
5MV661	Prehistoric	Petroglyph
5MV717	Prehistoric	22 Check Dams
5MV720	Pueblo III	Rubble Mound, 2 Rooms, kiva, Tower, Light Refuse
5MV728	Pueblo II-III	Rubble Mound, 3 Rooms, Tower, Kiva, Light Refuse

Table B.6. (cont.)

Site Number	Cultural Affiliation	Site Type
5MV730	Basketmaker III	Rubble Scatter, Pithouse, REFUSE
5MV731	Basketmaker III	Rubble and Ceramic Scatter
5MV740	Basketmaker III	Rubble and Ceramic Scatter
5MV741	Pueblo I-II	Rubble and Ceramic Scatter
5MV742	Pueblo I	Rubble Mound, Multiple Rooms, Refuse
5MV743	Pueblo II	Rubble Mound, 2-3 Rooms, Light Refuse
5MV744	Pueblo II	Rubble Mound, Refuse
5MV745	Pueblo I	Rubble Mound, Light Refuse
5MV746	Basketmaker III	Rubble Mound, Pithouse, Ceramics
5MV747	Pueblo II-III	Roomblock, 20 Rooms, 3 Kivas, Tower, 2 Refuse Mounds
5MV748	Pueblo I	Rubble Mound, Refuse
5MV749	Prehistoric	17 Check Dams
5MV750	Prehistoric	4 Check Dams
5MV751	Pueblo II	Rubble Mound, Kiva, Refuse
5MV752	Basketmaker III	Rubble and Ceramic Scatter, Pithouse
5MV756	Pueblo I	Rubble and Ceramic Scatter
5MV757	Basketmaker III-Pueblo I	Rubble Mound, Pithouse, Light Refuse
5MV758	Pueblo II	Rubble Mound, Light Refuse
5MV759	Pueblo I	Rubble and Ceramic Scatter, REFUSE
5MV760	Pueblo I	Rubble and Ceramic Scatter
5MV761	Prehistoric	3 Check Dams
5MV762	Basketmaker III-Pueblo I	Jacal Structure, 1 Room, Pithouse, Light Refuse
5MV763	Pueblo I	Jacal Structure, 20 Rooms, Light Refuse
5MV764	Pueblo I	Jacal Structure, 8 rooms, Light Refuse
5MV765	Pueblo I	Jacal Structure, 9 Rooms, Refuse
5MV767	Pueblo II	Rubble Mound, Refuse
5MV769	Pueblo I-II	Rubble Mound, 2 Rooms, Light Refuse

Table B.6. (cont.)

Site Number	Cultural Affiliation	Site Type
5MV770	Prehistoric	Rubble Mound, Refuse
5MV771	Basketmaker III-Pueblo I	Rubble and Ceramic Scatter, Pithouse
5MV772	Pueblo I	Jacal Structure, 1 Room, Light Refuse
5MV773	Pueblo III	Roomblock, 20 Rooms, Tower, 2 Kivas, Refuse
5MV774	Basketmaker III	Rubble Mound, Pithouse, Refuse
5MV775	Pueblo I	Jacal Structure, 4 Rooms, Light Refuse
5MV776	Pueblo II	Rubble Mound, Light Refuse
5MV777	Pueblo I	Rubble and Ceramic Scatter
5MV779	Pueblo II	Rubble Mound, light Refuse
5MV780	Prehistoric	42 Check Dams
5MV781	Pueblo II	Rubble Mound, 2 Rooms, 2 Kivas, Refuse
5MV782	Pueblo III	Rubble Mound, 40 Rooms, 2 Kivas, Tower, Refuse
5MV783	Pueblo II	Rubble Mound, Light Refuse
5MV784	Basketmaker III	Rubble and Ceramic Scatter, Pithouse
5MV923	Pueblo II	Rubble Mound, Kiva
5MV933	Pueblo III	Rubble Mound, Kiva, Light Refuse
5MV934	Prehistoric	29 Check Dams
5MV938	Prehistoric	9 Check Dams
5MV939	Basketmaker III-Pueblo I	Rubble Mound, Pithouse, Light Refuse
5MV940	Basketmaker III-Pueblo I	Rubble and Ceramic Scatter, Pithouse
5MV941	Basketmaker III-Pueblo I	Rubble and Ceramic Scatter
5MV942	Pueblo II	Rubble and Ceramic Scatter
5MV943	Historic Navajo	Sweat Lodge, Hearth, Oxidized Rock
5MV944	Prehistoric	32 Check Dams
5MV947	Prehistoric	13 Check Dams
5MV980	Prehistoric	20 Check Dams
5MV981	Pueblo III	Rubble Mound, 9 Rooms, Refuse, Petroglyphs, "Luebben's Site"

Table B.6. (cont.)

Site Number	Cultural Affiliation	Site Type
5MV82	Prehistoric	32 Check Dams
5MV986	Pueblo III	Roomblock, Kiva, Retaining Walls, Light Refuse
5MV989	Prehistoric	33 Check Dams
5MV991	Prehistoric	7 Check Dams
5MV997	Prehistoric	14 Check Dams
5MV998	Prehistoric	8 Check Dams
5MV1000	Prehistoric	Pictographs
5MV1001	Prehistoric	Petroglyph, "Pictograph Point"
5MV1035	Basketmaker III-Pueblo I	Rubble Scatter, Light Refuse
5MV1042	Historic Navajo	Sweat Lodge, Fire Stain
5MV1043	Historic Navajo	Sweat Lodge, Oxidized Rock
5MV1046	Pueblo I	Jacal Structure, Light Refuse
5MV1049	Pueblo II-III	Rubble Mound, Light Refuse
5MV1050	Pueblo III	Cliff Dwelling, 3 Rooms, Light Refuse
5MV1051	Pueblo III	Cliff Storage, 1 Room
5MV1054	Pueblo III	Roomblock, 2 Kivas, Retaining Wall, Light Refuse
5MV1055	Pueblo II-III	35 Check Dams
5MV1056	Pueblo III	Cliff Dwelling, 1 Room
5MV1057	Pueblo I-III	Roomblock, 8 Rooms, Light REFUSE
5MV1058	Pueblo II-Early Pueblo III	Rubble Mound, Kiva, Light Refuse, 15-20 Rooms
5MV3803	Historic	"Kelly Cabin"
5MV3909	Historic	Spruce Tree House Spring Catchment
5MV3895	Pueblo I	Rubble Scatter, Pithouse
5MV3898	Pueblo II-III	Cliff Dwelling, 2 Rooms, "Dilemma House"
5MV3899	Pueblo II	Kiln
5MV3938	Historic	E.C.W. Utility Area
5MV3939	Historic	Civilian Conservation Corps Camp NP-5C

Table B.6. (cont.)

Site Number	Cultural Affiliation	Site Type
5MV3940	Historic	Civilian Conservation Corps Camp NP-6C
5MV3941	Historic	Civilian Conservation Corps Mesa Verde Campground
5MV3942	Prehistoric/Historic	3 Prehistoric Check Dams, CCC Check Dam, and Outlet Culvert
5MV3945	Pueblo II	Kiln
5MV3962	Historic	1920s Spruce Tree Maintenance Yard
5MV3963	Historic	Deep Water Well and Water Treatment Complex
5MV3964	Historic	Chapin Mesa Water Catchment System
5MV3965	Historic	90,000 Gallon Spring Water Storage Tank
5MV3989	Historic	Million Gallon Tank
5MV3990	Historic	CCC Maintenance Yard
5MV3991	Historic	CCC Utility Housing Loop, (White House Loop)
5MV3992	Historic	CCC Hogan Area
5MV3993	Historic	Administration Buildings (Park Headquarters)
5MV3994	Historic	Hotel Concessionaire's Area
5MV3995	Historic	Fewkes Cabin
5MV3996	Historic	Amphitheater
5MV3998	Prehistoric	Kiln
5MV3999	Prehistoric	Hearth/Kiln
Total=500		

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APPENDIX C:
SOIL COMPACTION AND ARTIFACT DISPERSAL TESTS ON SITE 5MT10834

Steve R. Dominguez

Introduction

Due to the fact that impacts to site 5MT10834 could not be mitigated prior to construction of the access road the Park Service requested that a gravel pad be constructed over it. This was to be removed after construction was completed, and impacts mitigated at that time. Padding has been infrequently used to protect sites, and resulting impacts have not been investigated. Before padding is considered an acceptable option for site protection we should understand its effects. The padding of site 5MT10834 gave an opportunity to measure some of the consequent changes to both soil and artifacts.

This study measured three types of impacts to this archeological site: soil particle translocation, soil compaction, and artifact disturbance. Effects of soil particle illuviation and wind transport of fine particles were monitored by measuring changes in soil particle size distributions. Three components of soil compaction were measured: surface depression, dry bulk density, and soil penetrability. Two aspects of artifact disturbance were measured: dispersal and damage to surface artifacts.

Soil attributes were measured before and after padding. "Artifacts" consisting of glass shards were labeled and laid out in grids, and displacement and damage were assessed following mitigation. The initial intent was to measure impacts from construction and subsequent traffic only. However, the access road was still used after initial measurements and prior to construction of the pad. As a result, this test must be considered a measure of changes due to both traffic on the surface of the site, as well as construction and removal of the pad.

Results indicate that soil particle size distributions were changed, but generally to a degree less than that resulting from natural variation across the site. Compaction resulted in significant depression of the original surface, increased soil bulk density, and decrease in soil penetrability. Artifact movement indicated that artifacts can be significantly disturbed both beneath and near the pad.

Sequence of events

Previous to these tests the site had been bladed several times and driven over by pickup trucks for several years. When pre-padding conditions were measured and the shards laid out in 1992, the road consisted of a narrow two-track cut to depths up to 40 cm through a silty clay soil.

Following the initial measurement and layout, use of the road continued for several weeks prior to padding. As a consequence the test does not measure effects of padding and traffic on unaltered soil and artifacts. Instead it measures the impacts of light vehicle traffic, the addition of a thick soil covering, and compaction by large numbers of heavy vehicles.

Although the initial plan was to complete the tests the following spring, to minimize effects of changes in soil moisture, the work was finished in late summer of 1994.

Nature of the study location

5MT10834 occupies an erosional terrace at the west margin of a partly dissected alluvial fan. Erosion by an intermittent drainage to the west and a small ephemeral drainage at the east left a small north-south running interfluve. The road runs up the axis of the interfluve, nearly parallel to the fall-line of the surface (Figure 7.2).

The USDI Soil Conservation Service classifies the soil as Sili silty clay loam, on 6 to 12 percent slopes. It is formed in calcareous, moderately fine-textured alluvium derived dominantly from redeposited Mancos Shale. Soils formed on fans may have less than 35 percent clay (similar to that recorded at 5MT10834). This soil has high shrink-swell capacity, and low strength.

Methods

The tests were designed to be conducted with simple, easily accessible equipment immediately prior to installation and immediately following removal of the pad. Spatial controls were maintained from solid datum points using standard surveying techniques. The

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test techniques were kept as constant as possible. It was not assumed that the area outside of the padded area was unaltered. Rather, it was assumed that this area monitored processes occuring on the surface.

Transect and Sample Locations

The measurements or samples were all recovered in 1 meter increments across 10 m long transects that were perpendicular to the longitudinal axis of the road (Figure C.1). The location of each transect end point was mapped, as described below. These are lettered Transect A and Transect B.

All points for these tests were mapped from Datum A, located near the center of the padded section of road, approximately 5 m west of the west edge of the pad. All horizontal angles were on True North, as measured by the theodolite's internal compass.

Locations of all four ends of the test transects were located by theodolite and marked by offset stakes. If the transect markers had been buried or removed, the map locations of the endpoints of each test transect could be relocated, as listed in Table C.1. Vertical readings were based on an elevation of 0.00 m at Datum B, a large boulder located east of the road, near the south end of the padded portion of the site.

Table C.1. Locations of ends of Soil Test Transects

point:	horizontal angle	distance:
A0	103 52' 10"	5.50 m
A11	81 42' 50"	15.50 m
B0	106 49' 30"	21.06 m
B11	119 32' 30"	23.93 m

All points measured from Datum A

Each of the two transects was 10 m long. Each test station was spaced at 1 m increments along the transect, creating 11 stations for each transect. Each station was marked with a nail, which constituted the points for the surface depression test. Samples or measurements for the other three tests on Transect A were taken adjacent to each nail at the locations shown in Figure C.1. For this transect the penetration tests of A1, A2, A3, A4, A7, A8 A9 A10, and A11 were located 25 cm south of each nail. For A5 and A6 these were 25 cm SE of each nail. The south edge of each density sample were located 10 cm north of each nail, and the south edge of each PSA sample was 35 cm north of each nail.

Samples or measurements for the tests on Transect B were taken adjacent to each nail at the locations shown in Figure C.1. For this transect penetration tests are located 25 cm south of each nail. No density samples were recovered from Transect B. The south edge of each PSA sample are 20 cm north of each nail. Locations for subsequent data recovery were chosen near each of the stations, but spaced further from each station, in order to avoid disturbance from previous tests.

Soil Particle Transport Test

The purpose of this test was to measure the displacement of small soil particles (clays and silts) that occur due to repetitive compression, especially during periods of saturation. Such particle displacement can impact archeological investigations. The accurate detection and characterization of cultural and natural deposits and surfaces is influenced by soil composition. Differential displacement of soil particles can change soil structure and move apparent stratigraphic boundaries.

This test is done by analyzing soil particle compositions from soil samples collected at depths at given intervals. The distributions of particles observed prior to impact are compared to the distributions observed after impact. It is expected that percentages of clays and smaller silts will have changed significantly.

Procedures

1. Choose a location near the transect station that has not been previously sampled.

2. Excavate a sample of greater than 1 liter from 0 to 2 cm bs (below surface). Bag and label.

3. Excavate a sample of greater than 1 liter from 5 to 7 cm bs. Bag and label.

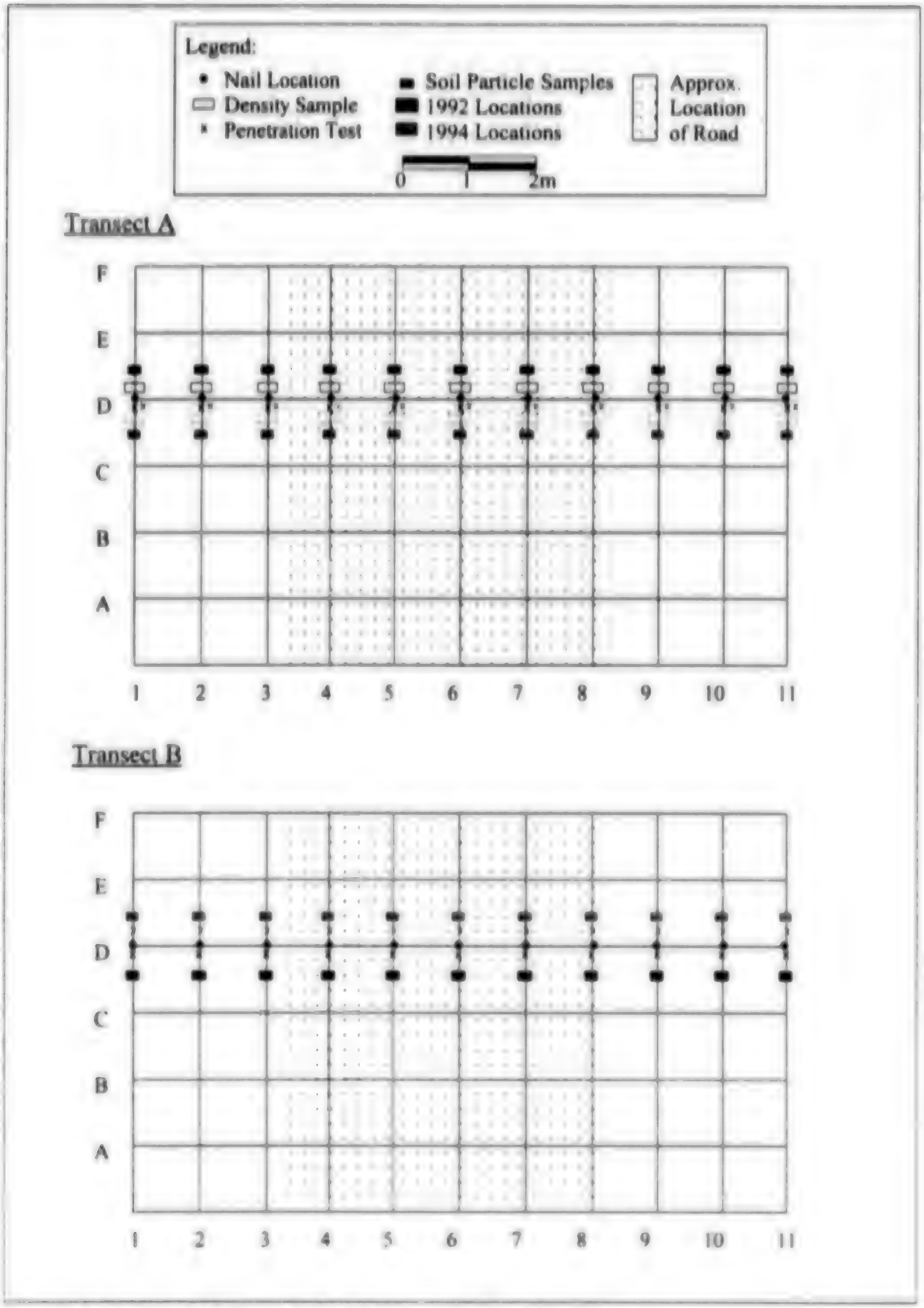

Figure C.1. Layout of Compaction Study transects at Site 5MT10834.

4. Excavate a sample of greater than 1 liter from 10 to 12 cm bs. Bag and label.

5. Submit for standard particle size analysis by commercial or government lab.

6. Plot the particle size distribution by depth for each station. Compare with the particle size distribution from the test prior to disturbance.

Surface Depression Test

The purpose of this test was to measure deformation of the original ground surface that occurs during compression. Such information is relevant to archeological investigations in that deformations affect locations and shapes of surfaces and features, as well as the integrity of deposits, surfaces, and artifacts.

This test was done by measuring the vertical displacement of each test location nail. The elevation of each was measured prior to and after padding. It was expected that areas heavily compressed would show vertical displacements of up to 5 cm.

Equipment

Completion of this test requires a metric stadia rod and a precise leveling device, such as a theodolite or dumpy level.

Procedures

1. Elevations were previously measured by theodolite and stadia rod relative to a vertical datum located at the point described in Table 1.

2. Extreme care should be exercised during removal of the pad and filter fabric to avoid disturbance of the nails. Locations of the nails constitute not only test data, but also locate areas from which other data were collected.

3. Following exposure, the elevation of the top of each nail should be measured by theodolite and stadia rod relative to the vertical datum.

4. Beginning and final elevations of the nails should be plotted and compared.

Density Test:

The purpose of this test is to measure the increase in soil density due to compression. This test constitutes a secondary measure of displacement.

This test was done by measuring the density before and after compaction. In this test the density was measured as the mass of a known volume. In the lab both the moist weight and the dryweight were divided by the volume to derive the density.

The precision of the test requires precise measurement of the volume that the sample represents. Due to the fact that the soil aggregates break up and expand during extraction, the volume cannot simply be measured in a container after removal. Instead the volume of the hole from which the sample was removed must be precisely measured. This volume is measured by refilling the hole created by extraction of the sample with sand, and calculating the volume of the sand used.

Equipment

This procedure requires sand of a known density and a bucket of known volume. It is preferable to use dry sand of a known density. It is suggested that the sand be dried prior to the test. A known volume should be weighed to determine the density. Weighing a larger sample (e.g. 10 liters) will give a more precise result.

The bucket should be over 2.5 liters, but not over 5.0 liters. It should have a flat upper surface, which will allow striking. ("Striking" means to run a straight edge across the top to make the top of the sand exactly match the top of the bucket). Plastic buckets that are graduated in metric volumes are available.

Procedure

1. Choose a location not disturbed by previous tests.

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2. Flatten a surface larger than 25 cm by 25 cm with a trowel.

3. Excavate a soil sample that is 20 cm by 20 cm by 10 cm. Bag and label the sample.

4. Fill the bucket to the top level with sand. Occasionally pack lightly. Strike the top so it is level. This procedure creates a known beginning volume with a fairly standardized compaction.

5. Pour the sand into the hole without spilling any. Stop occasionally to pack lightly. Pour until the hole is filled and can be struck across the top, even with the flat surface troweled prior to extraction of the sample. Any excess sand left from striking should be returned to the bucket. Bag and label the sand remaining in the bucket. This remainder sand will be used to calculate the volume of the hole.

6. In the lab weigh each of the soil samples directly from the bag, while they are still wet. Record the weight.

7. Dry the soil samples with the standardized procedure used for the original sample. The samples were each spread on aluminum trays at a thickness of less than 1 inch. They were each then autoclaved at 100 degrees C for 2 hours.

8. Weigh each sample and record the weight.

9. Dry and weigh each bag of remainder sand. Divide the weight by the density. This is the volume of the remainder. Subtract this from the initial volume contained in the bucket. This number is the volume of the hole.

10. For each soil sample, divide the dry weight by the volume of the hole. This is the density of the sample.

11. Plot the resulting densities and compare to the densities measured from samples taken prior to impact.

12. Repeat this procedure for the wet weights of the soil samples.

Penetration test

The purpose of this test was to measure the resistance of the soil to penetration by a flat-ended cylinder. This gives a measure of changes in the cohesiveness of soil particles. Differential cohesiveness of soil particles within and between cultural and natural sedimentary units (e.g. feature boundaries and feature fill) is an important factor in identification and interpretation of those units.

This test was done by measuring the distance penetrated by the cylinder during a "drop test". Measurements of penetration made prior to padding were compared to measurements made after removal of the padding. It was expected that the distances of penetration after padding will decrease significantly.

Equipment

The test bar is a steel bar 81 inches (183 cm) in length, 1.0 inch (2.54 cm) in diameter, and 13.02 lbs (6.02 kg) in weight. It has two sets of lines filed on the surface near either end. One end of the bar has a single line (the index line) that is 100 cm from the end. This end is the bottom of the cylinder, and will be set on the test point. One end has a pair of lines, spaced at 50 cm from each other. This end goes at the top. These lines constitute the drop interval for the fence post driver. The post driver weighs 16.25 lbs (7.39 kg). A drop interval of exactly 50 cm was used. Each of the 20 values plotted is a result of 5 individual drops, meaning that the penetration test represents a sample of 100.

Procedure

1. Locate a point near the station, but which is at least 10 cm from prior test locations.

2. Gently set the test bar on the point to be tested, so that it is perpendicular to the ground. The lower (index)

line is 100 cm from the ground surface. It is best to have one person hold the bar well below the bottom mark of the drop interval.

3. Gently slide the post driver over the top of the test bar. Dropping it onto the bar will invalidate subsequent readings at that point. When at rest, the bottom of the driver is at the lower line of the drop interval.

4. Raise the driver to the upper line of the drop interval. Hold it so that it will drop freely onto the bar, without the bar rubbing the inside of the post driver.

5. Release the bar so that it falls freely.

6. Measure the distance between the index line and the ground surface and record it.

7. Repeat steps 4, 5, and 6 three more times, so that a total of four drops are measured at each test location.

8. Repeat for each test station.

9. Plot the penetration distances for each station with the penetration distances from the first test.

Artifact Dispersal Test

The purpose of this test was to quantify the displacement of and damage to artifacts that can occur as a result of construction activities. In this case this includes traffic, covering with filter fabric and soil, and subsequent exposure. This test will demonstrate limitations of use of surface artifacts after such procedures, and argues for collection prior to padding. The use of "artifacts", glass shards coated with paint prior to burial additionally shows frequency and types of damage to artifacts.

This test is done by measuring the distance that each surface artifact moved from a known beginning point. The first part of the test was to lay out labeled shards on a grid. The final part of test was conducted by mapping items which can be relocated and analyzing displacement and damage to items.

Procedure

1. In the initial phase of the test a group of "artifacts" was created. These consist of pieces of broken glass which were spray painted blue. Each was then labeled with a location on the planned grid.

2. Two 1 x 1 m grids were laid out as part of the test transects described above. Grid points were labeled as shown in Figure 2. The number of each artifact is made up of the transect letter, the column number, and the row letter. Consequently, each artifact bears a number, such as A1a, A1b,...A2a, A2b..., etc.

3. Removal of the pad proceeded in two stages. Thick overburden was removed by machinery. Due to the deep ruts in the initial surface a portion of the pad should be left over the filter fabric. Shovel probes would help to determine thicknesses. The second stage should be removal by hand.

4. It is anticipated that some percentage of the artifacts will be relocated during removal of the filter fabric. Each should be mapped or point located relative to its point of origin. Other than the two endpoints of the soil test transects the locations of the grids were not left marked. The beginning location for each artifact relocated must be retaped from the soil test transect.

Results

Soil Particle Translocation

The results show consistent increase in percentages of silt, but there were few statistically significant changes. Specifically, silt increased in nearly all locations, but changes were generally not greater than natural background variation. It is likely that with a longer period of time or a larger pad the changes would become statistically significant.

All differences in percentage of the various particle size classes were tested by ANOVA (Analysis of Variance) to 0.5 significance. Percentage of each size class was tested independently of all others to avoid false correlation in the closed array of percentages. Due to closed array of soil particle distributions the general classes of "sand" and "clay" were contrasted in several tests, without reference to "silt". For several tests clay and fine silt were lumped, and referred to as "fine fraction"

Soil Particle Size Distributions Prior to Padding

Consistent with normal soil horizon development (Buol et al. 1989) the particle size distribution for samples taken before padding had the highest coarse fraction (sand) at the surface, and increasing fine fraction with depth, for all samples (Table C.2). One statistically significant difference was observed in particle size distributions between the samples taken in the road and samples taken out of the road. Table C.3 contrasts percent sand and fine fraction for all samples from in-road and off-road locations. The percent of clay was higher in the road, and lower off the road. This difference was significantly greater than the background variation. The percent of sand in this sample was higher off-road than in the road, but the difference is not significantly greater than the background variation.

It may be suggested that the higher percentage of fine fraction in the road is due to the fact that the road was bladed to depths as great as 40 cm lower than the original ground surface. This would expose the lower soil horizon, which is naturally higher in clay. However, the results of comparisons among samples from different depths (Table C.4) indicate this is a change in particle sizes of the the surface, rather than a change in horizon: for samples from 0 - 3 cmbs, the ANOVA shows significant difference in fine fraction between samples from in the road and off the road. For samples from 8-10 cmbs and 12-15 cmbs, ANOVA does not show significant differences in the fine fraction between samples from in the road and off the road. The reason for this cannot be determined with the information available.

Soil Particle Size Distributions Post-padding

As discussed later, the same tests for differences in particle size distributions were run for the samples taken after removal of the padding: with comparisons between in-road and off-road, and by depth. Changes in particle size distributions are consistent with each other, but results of ANOVA comparing pre- and post-padding particle size distributions show statistically significant change only in very fine silt.

Table C.5 shows ANOVA for percent change of soil particle fractions for samples taken in-road. The percentages of sand and clay decreased slightly, and all silt increased slightly, but the changes are not significantly greater than the natural variation.

Table C.6 shows ANOVA for percent change of soil particle fractions for samples taken off-road. Percentages of both silt and clay increased slightly, and sand decreased slightly, but the changes for these particle size classes are not significantly greater than the natural variation.

When ANOVA was run for each individual particle size class only oneshowed a statistically significant increase: very fine silt (Table C.7). Results of ANOVA for particle size distributions by location show a change which is consistent with the increase in very fine silt in offroad locations. As previously discussed, Tables C.3 and C.4 indicate that prior to padding the percentage of fine fraction was significantly greater in the top 3 cm of the road than in the top 3 cm of the offroad locations. Tables C.8 and C.9 show that after padding the percentage of fine fraction in the top 3 cm of offroad locations increased sufficiently that this difference was no longer significant. The most likely source for the very fine silt is airborne dust from traffic.

Table C.2. ANOVA for Percent of Fine Fraction by Depth Below Surface for All Samples

	Mean	Std Deviation	N		
0-3 cmbs	30.25	7.36	40		
8-10	34.75	7.49	40		
12-15	37.02	8.52	40		
Whole Sample	34.01	7.81	120		
ANOVA Source:	**Sum of squares**	**D.F.**	**Mean square**	**F**	**Sig.**
Between groups	975.77	1	487.89	8.00	.0005
Within groups	7316.13	117	60.97		

Table C.3. ANOVA for Percent of Difference of Clay and Sand Fraction by Location, Prior to Padding

Sand:	Mean	Std Deviation	N		
Off road	32.51	12.87	30		
On road	28.37	10.62	30		
Whole Sample	30.44	11.88	60		
ANOVA Source:	**Sum of squares**	**D.F.**	**Mean square**	**F**	**Sig.**
Between groups	257.59	1	257.59	1.85	.1790
Within groups	8074.37	58	139.21		
Fine Fraction:	Mean	Std Deviation	N		
Off road	32.55	8.59	30		
On road	35.54	7.64	30		
Whole Sample	34.01	8.24	60		
ANOVA Source:	**Sum of squares**	**D.F.**	**Mean square**	**F**	**Sig.**
Between groups	275.25	1	274.25	4.14	.0441
Within groups	8017.65	58	66.26		

Table C.4. ANOVA for Percent of Fine Fraction by Location and Depth, Prior to Padding

0-3 cmbs:	Mean	Std Deviation	N		
Off road	26.32	4.96	10		
On road	33.36	8.03	10		
Whole Sample	29.84	7.43	20		
ANOVA Source:	**Sum of squares**	**D.F.**	**Mean square**	**F**	**Sig.**
Between groups	247.25	1	247.25	5.56	.0299
Within groups	800.92	18	44.50		
7-9 cmbs:	Mean	Std Deviation	N		
Off road	33.59	8.91	10		
On road	35.27	8.07	10		
Whole Sample	34.43	8.32	20		
ANOVA Source:	**Sum of squares**	**D.F.**	**Mean square**	**F**	**Sig.**
Between groups	14.18	1	14.18	.20	.6630
Within groups	800.92	18	44.50		
12-15 cmbs:	Mean	Std Deviation	N		
Off road	34.16	9.78	10		
10On road	38.03	7.56	10		
Whole Sample	36.10	8.72	20		
ANOVA Source:	**Sum of squares**	**D.F.**	**Mean square**	**F**	**Sig.**
Between groups	74.92	1	74.92	98	.3341
Within groups	1369.04	18	76.06		

Table C.5 ANOVA for Change of Soil Fractions After Padding, for All Levels, In Road

Sand:	Mean	Std Deviation	N		
Pre-padding	28.65	10.21	30		
Post padding	26.58	11.08	30		
Whole Sample	27.67	10.60	60		
ANOVA Source:	**Sum of squares**	**D.F.**	**Mean square**	**F**	**Sig.**
Between groups	67.05	1	67.05	0.59	.4441
Within groups	6894.22	58	113.02		
Silt:	Mean	Std Deviation	N		
Pre-padding	24.15	4.60	30		
Post padding	25.63	4.64	30		
Whole Sample	24.85	4.64	60		
ANOVA Source:	**Sum of squares**	**D.F.**	**Mean square**	**F**	**Sig.**
Between groups	34.46	1	34.46	1.61	.2087
Within groups	1302.13	58	21.35		
Clay:	Mean	Std Deviation	N		
Pre-padding	31.39	6.67	30		
Post padding	30.60	6.93	30		
Whole Sample	31.01	6.75	60		
ANOVA Source:	**Sum of squares**	**D.F.**	**Mean square**	**F**	**Sig.**
Between groups	9.63	1	9.63	0.21	.6496
Within groups	2861.20	58	46.17		

Table C.6. ANOVA for Change of Soil Fractions After Padding, for All Levels, Off Road

Sand:	Mean	Std Deviation	N		
Pre-padding	32.75	13.30	30		
Post padding	38.37	11.92	30		
Whole Sample	30.36	12.66	60		
ANOVA Source:	**Sum of squares**	**D.F.**	**Mean square**	**F**	**Sig.**
Between groups	290.51	1	290.51	1.84	.1802
Within groups	25.37	58	157.95		
Silt:	**Mean**	**Std Deviation**	**N**		
Pre-padding	23.81	7.12	30		
Post padding	25.37	4.32	30		
Whole Sample	24.65	5.77	60		
ANOVA Source:	**Sum of squares**	**D.F.**	**Mean square**	**F**	**Sig.**
Between groups	36.99	1	36.99	1.11	.2965
Within groups	1967.08	58	3.34		
Clay:	**Mean**	**Std Deviation**	**N**		
Pre-padding	27.19	7.42	30		
Post padding	28.97	7.97	30		
Whole Sample	28.15	7.71	60		
ANOVA Source:	**Sum of squares**	**D.F.**	**Mean square**	**F**	**Sig.**
Between groups	47.84	1	47.84	0.80	.3741
Within groups	3519.58	58	59.65		

Table C.7 ANOVA for Percent Change of Very Fine Silt Before and After Padding, Level 1, Off Road

0-3 cm bs:	Mean	Std Deviation	N		
Pre padding	2.92	.84	10		
Post padding	4.21	1.50	10		
Whole Sample	3.60	1.23	20		
ANOVA Source:	**Sum of squares**	**D.F.**	**Mean square**	**F**	**Sig.**
Between groups	8.67	1	8.68	5.73	.0272
Within groups	28.72	18	1.51		

Table C.8 ANOVA for Percent Difference of Sand and Fine Fraction by Location, After Padding

Sand:	Mean	Std Deviation	N		
Off road	28.37	11.92	30		
On road	26.58	11.08	30		
Whole Sample	27.52	11.47	60		
ANOVA Source:	**Sum of squares**	**D.F.**	**Mean square**	**F**	**Sig.**
Between groups	50.02	1	50.02	.37	.5418
Within groups	8106.47	58	132.89		
Fine Fraction:	Mean	Std Deviation	N		
Off road	29.27	7.85	30		
On road	30.90	7.12	30		
Whole Sample	30.05	7.50	60		
ANOVA Source:	**Sum of squares**	**D.F.**	**Mean square**	**F**	**Sig.**
Between groups	41.78	1	41.78	.74	.3930
Within groups	2914.66	58	50.25		

Table C.9. ANOVA for Percent Difference of Fine Fraction by Location and Depth, After Padding

0-3 cmbs:	Mean	Std Deviation	N		
Off road	28.80	7.73	10		
On road	32.65	6.93	10		
Whole Sample	30.63	7.46	20		
ANOVA Source:	**Sum of squares**	**D.F.**	**Mean square**	**F**	**Sig.**
Between groups	77.49	1	77.49	1.42	.2478
Within groups	1035.67	18	54.51		
7-9 cmbs:	Mean	Std Deviation	N		
Off road	34.59	5.12	10		
On road	35.57	8.54	10		
Whole Sample	35.05	6.80	20		
ANOVA Source:	**Sum of squares**	**D.F.**	**Mean square**	**F**	**Sig.**
Between groups	5.03	1	5.03	10	.7506
Within groups	918.45	18	48.34		
12-15 cmbs:	Mean	Std Deviation	N		
Off road	37.51	10.15	10		
10On road	38.34	6.63	10		
Whole Sample	37.91	8.45	20		
ANOVA Source:	**Sum of squares**	**D.F.**	**Mean square**	**F**	**Sig.**
Between groups	3.66	1	3.66	.05	.8275
Within groups	1369.04	18	76.06		

Surface Depression Test

Results for both transects are graphed in Figure C.2. Each graph shows the elevations across the transect at a 5:1 vertical exaggeration to clearly show the changes, and at 1:1 to show the actual shape of the road surface.

The mean change for all locations below the pad is a decrease in elevation of 1.6 cm (s.d. = 2.6). It appears that rutting prior to padding affected these readings. One reading on transect A is 5 cm higher, possibly a result of mounding by tires on moist soil of the road. On Transect B one reading is 8 cm lower, or approximately 5 cm lower than the surrounding surface. It is possible that this is a rut, rather than a depressed surface. Excluding those two extreme readings, the mean difference is a decrease in elevation of 1.6 cm (s.d. = 0.9).

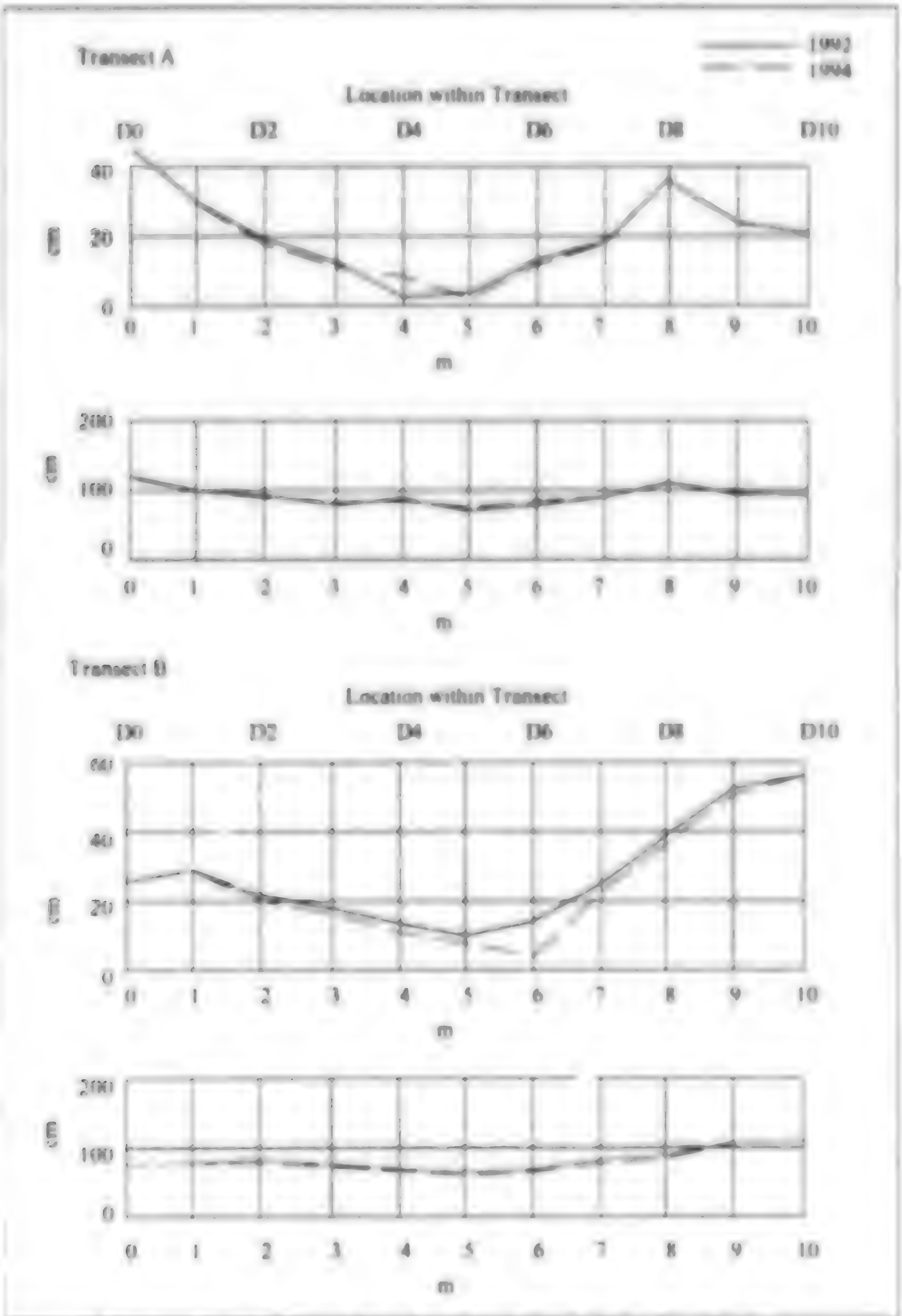

Figure C.2. Graph of surface elevations from Surface Depression Test.

Dry Bulk Density

Table C.10 shows 1992 and 1994 dry bulk densities, gravimetric soil moisture, and total penetration depths for all of Transect A. In 1992 only penetration depths and soil particle distributions were measured for Transect B. Table C.11 shows penetration depth, without 1992 bulk densities or gravimetric soil moisture. Results of the dry bulk density test are consistent with the change in surface elevations: the 1992-1994 decrease in elevations due to compaction are consistent with the 1992-1994 increase in dry bulk densities (ρ_d).

Prior to discussing the effects of compaction, the effects of changing soil moisture must be considered. The mean of all 1994 bulk densities (mean ρ_d = 1.60 kg/ltr; s.d. = 0.21) is higher than the mean of all 1992 bulk densities (mean ρ_d = 1.40; s.d. = 0.92) by a factor of 1.14. This increase is not due to soil compaction alone, since the mean 1994 bulk densities of the off-road areas (mean ρ_d = 1.44; s.d. = 0.13) is higher than the mean of the 1992 off-road bulk densities (mean ρ_d = 1.30; s.d. = 0.03) by a factor of 1.11. Rather, the increase in mean ρ_d is due to the great decrease in soil moisture (Table C.10) and consequent shrinkage of the clay (Mitchell 1976). Shrinkage of clay in drying results in collection of a sample with smaller void ratio (with mean ρ_m < 1.0) and a greater soil fraction (with mean ρ_m = 2.65, Das 1979). The 1992 pre-padding test indicates that prior traffic alone had increased the density of soil from a mean ρ_d = 1.30 kg/ltr (s.d. = 0.03) in locations off the road to a mean ρ_d = 1.55 (s.d. = 0.04) in the road, or by a factor of 1.19 higher. The post-padding test shows that padding and heavy traffic increased the density of soil in the road to a mean ρ_d = 1.81 (s.d. = .12) compared to the mean ρ_d = 1.44 (s.d. = .13) for the soil from the roadside, or by a factor of 1.26 higher. Even after correction for clay-shrinkage (1.81 (kg/ltr) / 1.11 (shrink-swell ratio)) the road-compacted soil still has a mean density of ρ_d = 1.64, far greater than the 1992 road-compacted density of 1.55.

Table C.10. 5MT10834, Transect A, Penetration Depths, Dry Bulk Densities, and Gravimentric Soil Contents

	Total Depth of Penetration, d (cm)		Dry Bulk Density, ρ_d (kg/ltr)		Gravimetric Moisture Content (gm/gm)		
Location	1992	1994	1992	1994	1992	1994	Condition
D1	20.5	7.8	1.33	1.57	.152	.032	nonpadded
D2	16.9	3.3	1.29	1.56	.189	.031	nonpadded
D3	19.9	1.5	1.34	1.49	.189	.034	nonpadded
D4	11.0	1.5	1.52	1.78	.132	.037	padded
D5	14.9	1.3	1.60	1.98	.172	.084	padded
D6	16.2	2.3	1.50	1.84	.177	.090	padded
D7	9.4	2.9	1.56	1.65	.153	.084	padded
D8	19.2	4.3	1.26	1.41	.186	.038	nonpadded
D9	25.0	2.5	1.29	1.32	.175	.022	nonpadded
D10	18.3	3.5	1.31	1.39	.202	.016	nonpadded
Mean	17.1	3.1	1.46	1.60	.173	.047	
Standard Deviation	4.6	1.9	1.29	0.21	0.21	.028	

Table C.11. 5MT10834, Transect B, Total Depths of Penetration

Location	Total Depth of Penetration, d (cm) 1992	1994	Condition
D1	20.5	4.5	Nonpadded
D2	24.0	4.1	Nonpadded
D3	16.3	3.6	Nonpadded
D4	16.2	2.6	Padded
D5	8.3	1.4	Padded
D6	18.0	1.6	Padded
D7	17.0	1.0	Padded
D8	23.9	3.6	Nonpadded
D9	19.8	5.2	Nonpadded
D10	19.5	4.0	Nonpadded
Mean	18.4	3.2	
Standard Deviation	4.3	1.4	

Soil Penetrability

Variations in penetrability observed during this test are considered a function of gravimetric soil moisture and bulk density (Campbell and O'Sullivan 19__). The results of this test will be evaluated in context of those two variables.

The results of the soil penetration test are consistent with results of the surface depression and the dry bulk density tests (Table C.12), in that they indicate a large decrease in penetrability of soil in compacted areas. Unfortunately, because of seasonal change in soil moisture the depths of penetration varied greatly. Due to the non-standard test procedure used, the statistical significance of the changes cannot be determined.

As shown in Table C.12, the 1992 soil samples had a mean gravimetric moisture content of .1727 (s.d. = .0213) and the 1994 a mean of .0467 (s.d. = .0278).

The effect of the moisture content is apparent in the mean penetration depths of 17.1 cm (s.d. = 4.6) for the 1992 test contrasted to the mean depth of 3.1 (s.d. = 1.9) for the 1994 test.

However, comparisons can be made between depths from non-compacted roadside and compacted roadway locations for each year's soil moisture condition. In the moist soils of 1992 the mean penetration was decreased from 20.3 cm (sd = 2.7) to 13.9 (sd = 3.7), a factor of 0.68, by compaction caused by light traffic alone. In the dry soil conditions of 1994 the mean rate of penetration was decreased from 4.1 cm (sd = 1.5) to 1.8 (sd = 0.7), a factor of 0.44, by compaction caused by both traffic and padding. In Figure C.4 the total depth of penetration is graphed by drybulk density. All 1992 values are shown as dots, and all 1994 values as x's. Values recorded in the road are enclosed within dashed lines. Overall the values for bulk density appear to be a power function with a negative exponent lower than -1.0. Among the 1992 values the relationship between bulk density and depth of penetration are clear: the greatest depths of penetration are associated with the lowest values for bulk density. Among the 1994 values this relationship is not as clear: all of the high bulk density values are associated with very low values for depth, and the depths associated with low bulk densities do not vary greatly.

In Figure C.5 total depth of penetration is graphed by gravimetric soil moisture. All 1992 values are shown as dots, and all 1994 values as x's. Values recorded in the road are enclosed within dashed lines. Overall the values for d appear to be a power function of fid with an exponent greater than 1.0. Among the 1992 values the relationship between soil moisture and depth of penetration are clear: the greatest depths of penetration are associated with high values for soil moisture. Among the 1994 values this relationship is not evident: the greatest depths of penetration are not associated with high values for soil moisture. Instead, the greatest depths of penetration are associated with the non-compacted off-road locations. All of the compacted on-road locations have small depths of penetration, which do not vary with gravimetric soil moisture. This suggests that the degree of compaction has exceeded the capacity for low levels of soil moisture to decrease resistance to penetration.

Figure C.3. 5MT10834, Transect A, graph of penetration depth by dry bulk density.

Figure C.4. 5MT10834, Transect A, graph of penetration depth by gravimetric soil moisture.

Table C.12a. Pre-Padding Soil Particle Size Distribution Raw Data for Transect A

Location	Percent Sand	Percent Coarse Silt	Percent Fine Silt	Percent Very Fine Silt	Percent Clay
Transect A:					
D1	25.89	18.02	21.63	3.60	30.86
	15.97	14.01	24.39	15.57	30.06
	21.19	12.97	22.31	5.71	37.83
D2	46.46	18.55	14.42	3.09	17.47
	45.02	16.46	14.91	3.09	20.53
	60.33	2.55	18.33	2.55	16.25
D3	47.03	19.88	12.23	1.53	19.33
	53.23	19.85	10.18	1.53	15.23
	58.35	17.29	7.63	2.03	14.70
D4	50.09	17.33	13.25	2.04	17.29
	46.94	18.89	11.23	2.55	20.38
	51.21	14.75	12.72	2.03	19.29
D5	34.55	17.87	18.38	3.57	25.63
	24.64	16.90	23.55	4.61	30.31
	20.59	15.96	26.26	4.63	32.55
D6	19.31	13.95	23.25	5.17	38.33
	16.79	14.97	23.74	5.16	39.33
	17.76	14.46	24.28	4.13	39.36
D7	20.51	15.37	22.02	4.61	37.49
	19.47	12.89	22.68	4.12	40.83
	19.37	14.36	22.57	5.13	38.57
	18.07	14.92	23.67	4.63	38.70
D8	30.94	24.18	20.58	3.60	20.69
	28.32	21.63	20.08	3.60	26.36
	22.43	14.46	20.66	5.16	37.29
D9	33.95	21.47	19.94	2.56	22.08
	28.64	18.97	17.94	2.56	31.88
	22.61	13.91	18.55	5.67	39.26
D10	30.18	21.02	21.02	4.10	23.68
	13.28	14.61	30.79	7.31	34.02
	19.85	14.46	25.31	5.16	35.22

Table C.12b Pre-Padding Soil Particle Size Distribution Raw Data for Transect B

Location	Percent Sand	Percent Coarse Silt	Percent Fine Silt	Percent Very Fine Silt	Percent Clay
Transect B					
D1	22.52	20.50	24.08	3.59	29.31
	19.83	16.97	22.62	5.14	35.44
	19.86	16.45	26.21	5.14	32.34
D2	29.36	15.36	27.66	3.59	24.03
	22.97	16.96	24.66	4.62	30.79
	27.18	16.95	20.55	3.60	31.73
D3	42.15	28.48	5.09	3.05	21.24
	48.17	13.75	11.20	2.04	24.83
	43.93	13.28	13.28	4.09	25.42
D4	25.85	15.88	22.54	3.59	32.15
	19.61	17.44	21.54	4.62	36.80
	23.02	16.45	21.07	5.14	34.31
D5	28.43	14.96	20.63	4.13	31.85
	24.04	15.01	22.26	4.14	34.55
	20.50	16.55	21.20	4.14	37.62
D6	25.76	15.49	22.21	4.13	32.41
	35.87	15.93	16.45	3.08	28.66
	22.61	14.99	21.19	4.65	36.57
D7	39.65	16.91	16.40	3.08	23.97
	48.46	14.83	13.30	2.56	20.85
	45.78	13.84	12.82	3.08	24.48
D8	22.83	16.08	21.27	5.71	43.12
	20.53	16.54	22.74	4.65	35.54
	25.32	12.38	10.12	5.67	36.51
D9	31.14	18.53	21.11	2.06	27.16
	24.40	14.52	22.30	4.67	34.11
	22.84	16.08	20.75	2.59	37.74
D10	40.60	22.58	15.91	2.05	18.86
	31.38	18.61	17.57	3.10	29.34
	27.10	16.57	21.75	4.66	29.91

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Table C 13a. Post Padding Soil Particle Size Distribution Raw Data for Transect A

Location	Percent Sand	Percent Coarse Silt	Percent Fine Silt	Percent Very Fine Silt	Percent Clay
Transect A:					
D1	25.71	20.59	21.10	5.15	27.45
	19.80	14.74	25.28	3.69	36.50
	19.14	14.86	23.36	4.25	38.39
D2	41.39	19.48	18.46	3.08	17.59
	26.30	26.79	18.91	1.05	26.95
	26.14	24.92	10.09	2.12	27.74
D3	48.63	14.34	16.39	2.05	18.60
	49.52	11.53	14.15	3.67	21.13
	62.11	9.70	8.08	3.23	16.88
D4	57.79	10.51	10.51	2.63	18.56
	46.61	19.45	13.82	3.58	16.54
	43.46	18.79	11.48	5.22	21.05
D5	33.43	17.02	20.63	4.64	24.27
	21.06	15.68	23.00	5.23	35.04
	12.79	13.57	26.63	5.74	41.26
D6	27.35	15.86	21.48	5.63	29.69
	19.05	15.37	25.61	5.12	34.85
	19.97	20.00	26.16	4.62	29.25
D7	24.32	16.87	21.47	6.13	31.21
	22.18	17.40	22.01	4.61	33.80
	21.77	17.89	22.49	5.11	32.73
D8	31.97	24.54	19.94	4.60	18.94
	28.37	24.04	21.48	3.58	22.53
	21.31	15.94	21.08	4.11	37.55
D9	30.14	21.08	22.62	2.57	23.59
	23.64	17.04	20.66	5.16	33.50
	19.77	15.02	20.20	5.18	39.83
D10	27.05	23.49	21.44	4.60	23.43
	22.88	15.54	23.83	4.14	33.61
	18.73	12.59	18.89	6.30	43.49

Table C.13b. Post Padding Soil Particle Size Distribution Raw Data for Transect B

Location	Percent Sand	Percent Coarse Silt	Percent Fine Silt	Percent Very Fine Silt	Percent Clay
Transect B					
D1	27.24	20.02	22.50	6.67	23.49
	20.98	17.99	25.18	4.63	31.23
	26.69	16.55	24.31	4.14	28.32
D2	30.14	19.50	24.63	3.08	22.45
	18.42	26.89	24.82	4.14	25.73
	24.99	21.10	23.16	4.63	26.12
D3	39.46	20.44	16.35	4.09	19.66
	31.59	19.99	21.01	4.61	22.80
	14.13	13.57	29.24	6.26	36.80
D4	22.91	17.69	23.68	5.79	29.72
	19.00	16.78	21.50	5.24	37.48
	17.85	14.89	22.87	5.32	39.08
D5	29.66	18.47	20.53	3.08	28.24
	13.46	20.98	25.17	5.24	35.15
	31.30	14.97	10.14	4.13	29.45
D6	28.87	14.53	22.32	3.63	30.64
	20.80	17.60	22.25	4.14	35.21
	7.09	20.13	27.35	6.19	39.24
D7	33.66	16.45	19.54	5.14	25.21
	40.39	15.82	13.27	3.57	20.95
	33.79	13.85	19.50	3.59	29.27
D8	26.23	13.41	20.63	4.13	35.60
	17.06	16.48	22.66	4.64	39.16
	22.71	15.48	21.16	4.13	36.52
D9	20.34	17.62	19.69	6.22	36.14
	20.35	15.12	21.38	4.69	38.46
	20.35	16.16	21.38	3.65	38.46
D10	20.21	14.01	22.83	5.19	37.76
	27.53	23.17	18.02	5.66	25.62
	20.01	15.16	21.11	5.41	38.31
D11	30.45	23.57	22.03	3.59	20.37
	28.78	18.61	19.13	5.69	27.79
	19.37	13.63	24.12	4.19	38.68

Artifact Disturbance

Loss Rate and Distance of Movement

Several clear relationships were observed between shard location, transport, and damage. The raw data are shown in Table C.14. Figure C.5 shows the total number of shards recovered for both test transects combined. These are plotted with respect to original distance from the centerline of the road, from 0 to 5 meters. Since the centerline was represented by only one line of shards the number for 0 meters was doubled to be comparable to the numbers for 1 to 5 m.

The percent recovered from the padded area was high, from 70 to 100 percent, and averaged 81 %. The highest rate of recovery, 100 percent, was 3 m from the centerline, well out of the original road, and under the padded area. The lowest recovery was 30 %, 5 m from the centerline, and outside of the padded area.

The percent of recovery of shards from the original road was expected to be lower than that which occurred, due to traffic prior to padding. It was expected that recovery outside of the padded area would be very high, due to lack of traffic or other disturbance. The reason for the high rate of loss outside of the padded area is not readily apparent, but it is likely that they were washed away, as discussed later.

The distances that shards were transported are consistent with the suggestion that lost shards were washed away. Figure C.6 shows the distance transported by distance from the road centerline. The mean distances of transport within the original road and the padded area are moderately low, means ranging from 11.7 to 46.0 cm. In contrast, the mean distance outside of the padded area is high, 65.2 cm. In this area the measured distances of transport ranged from 8 to 132 cm.

The high rate of loss and the high distances of transport in exposed areas near the pad suggest a substantial change in the quantities of water moving across the surfaces near the pad. Increases in flow can result from two processes, increased flow generation or rerouting of flow from other areas. It is extremely likely that the newly placed and compacted road fill generated very high runoff (Ritter and Gardner 1993), readily moving the exposed items. It is also likely that the berm created by the pad would have redirected flow which normally would have occurred in thin sheets and concentrated it into deeper, faster flow.

Artifact damage

As expected, frequency of breakage of the glass shards decreases with increasing distance from centerline. Figure C.7 shows the number of breaks per shard by distance to centerline. The mean number of breaks for all shards is 0.8. The number of breaks per shard is highest at the centerline, 1.4 per shard. The number decreases with distance from centerline, but remains surprisingly high at distances of 4 m (0.7 per shard) and 5 m (0.8 per shard). The high number in the original road could be expected due to the high probability of being run over. The high number of breaks at the edges of the test transect are probably due to trampling of exposed shards during and after padding.

The relative number of flake scars varies greatly with distance to centerline. Figure C.7 shows the number of flake scars per shard by distance to centerline. The mean number of scars for all shards is 3.3. The number of scars per shard varies greatly from 0 m to 3 m from centerline (2.9, 4.6, 2.6, and 5.9 per shard), with a mean number of 4.0 per shard. The frequency drops greatly at 4 m and 5 m (1.0 and 0.5), to an average of 0.8 flake scars per shard.

Table C.14 Artifact Disturbance Study Raw Data for Transect A

Location	Distance from 0 (m)	Distance Moved (cm)	# Flake Scars	# Breaks
B4	2	30	4	0
F6	0	44	0	0
E5	1	40	0	0
A7	1	11	0	0
C5	1	20	3	0
C4	2	35	0	0
B5	1	16	0	0
C3	3	27	14	0
A3	3	16	15	7
B3	3	29	1	0
B7	1	17	2	0
C7	1	55	0	0
F8	2	53	28	4
B8	2	15	8	1
E4	2	30	0	0
E8	2	33	2	0
E3	3	37	27	5
E7	1	26	9	0
C8	2	6	0	0
F7	1	36	7	0
F4	2	29	7	0
E6	0	48	15	6
F5	1	58	21	6
F3	3	53	3	4
A2	4	60	1	0
A5	1		0	0
A9	3	36	2	0
A10	4	20	0	0
B1	5	24	0	0
B2	4	44	0	0
B9	3	30	0	0
B10	4	0	0	1
C1	5	58	0	0
C2	4	37	0	0
C9	3	25	0	0
C10	4	3	0	0
E1	5	8	0	0
E9	3	18	0	0
E10	4	7	0	0
F1	5	67	0	0
F9	3	27	1	0
F10	4	3	0	0

Table C.15 Artifact Disturbance Study Raw Data for Transect B

Location	Distance from 0 (m)	Distance Moved (cm)	# Flake Scars	# Breaks
A1	5	132	0	0
A4	2	5	3	1
A5	1	10	10	0
A6	0	20	0	0
A8	2	16	0	0
A9	3	29	7	0
A10	4	23	0	0
B1	5	122	12	1
B2	4	103	9	0
B3	3	18	0	0
B4	2	4	1	4
B5	1	11	9	5
B6	0	12	0	0
B7	1	10	19	4
B8	2	12	16	10
B9	3	11	0	0
B10	4	10	3	0
C3	3	14	0	0
C4	2	8	0	0
C6	0	15	0	0
C7	1	9	1	0
C8	2	9	0	0
C9	3	9	0	0
C10	4	19	0	0
E2	4	104	0	0
E3	3	13	0	0
E4	2	10	0	0
E5	1	10	1	0
E6	0	15	0	0
E7	1	15	0	0
E9	3	7	0	5
E10	4	16	0	0
F3	3	5	0	0
F4	2	186	0	0
F6	0	20	5	0
F7	1	17	0	0
F8	2	28	0	4
F9	3	8	0	0

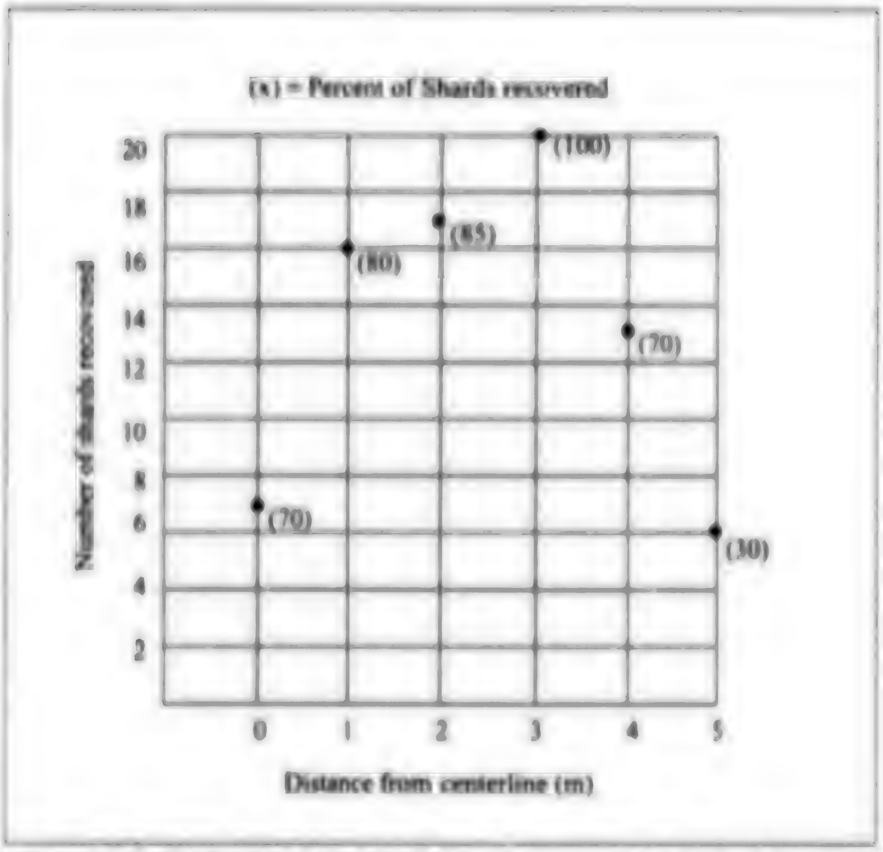

Figure C.5. SMT10834, Number of shards recovered by distance from centerline.

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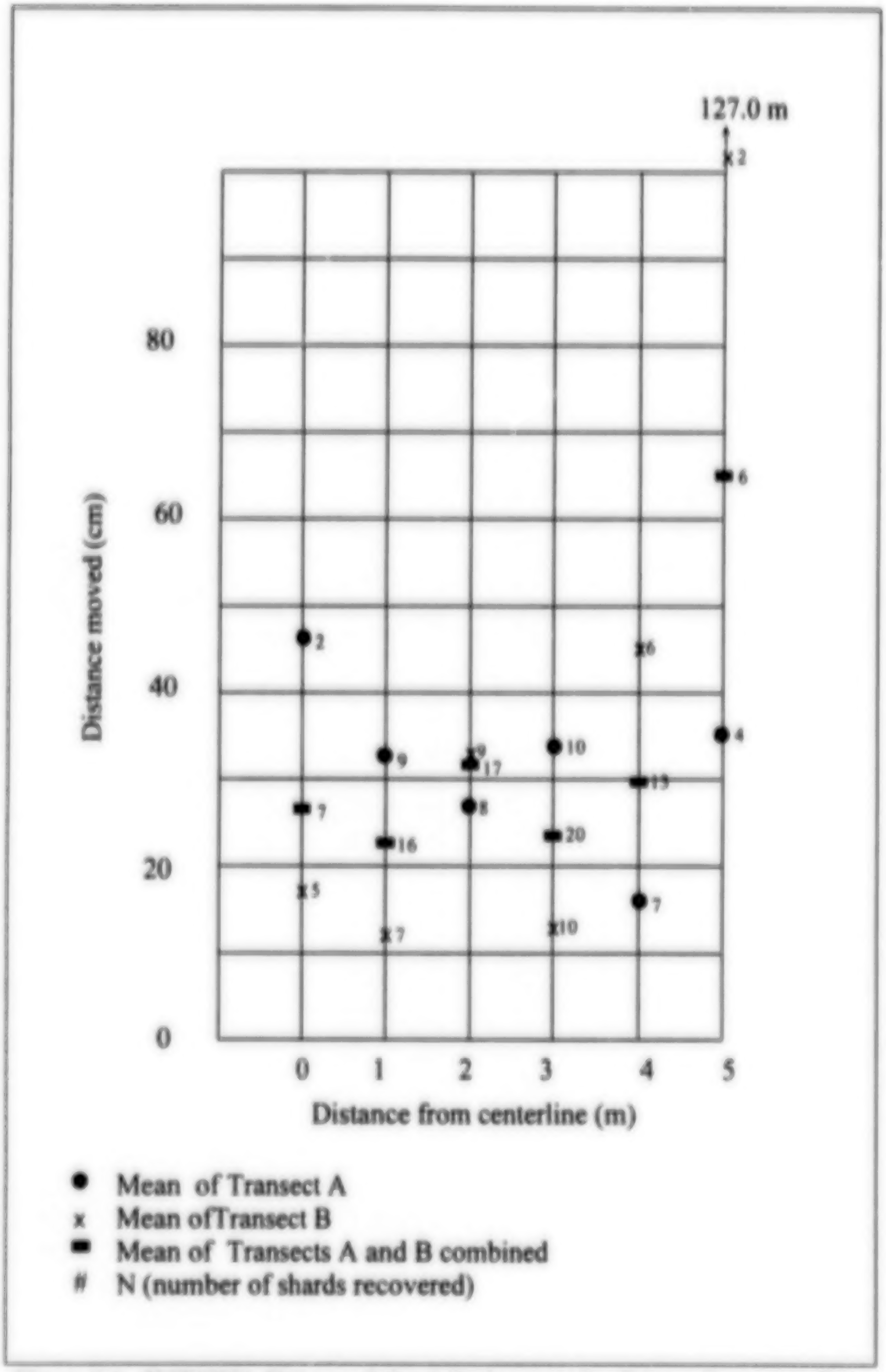

Figure C.6. 5MT10834, Distance of shard displacement by distance from centerline.

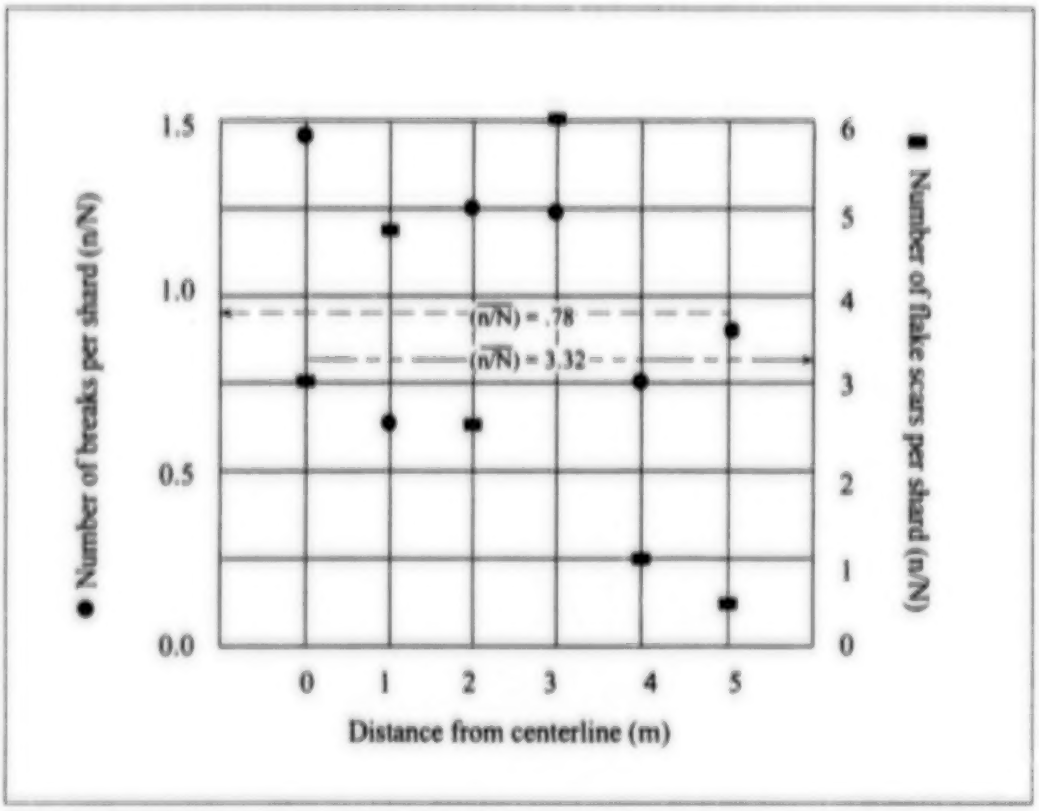

Figure C.7. 5MT10834, number of breaks and flake scars per shard by distance from centerline.

Summary of Tests

The particle transport test indicates that the percentage of silt increased both in the road and off the road, but the only statistically significant increase occurred in the top 3 cm of soil off of the road. This is probably a result of airborne dust from traffic.

The compaction tests show a consistent relationship among surface depression, increases in dry bulk density, and decreases in depths of penetration. When contrasted to changes in soil moisture and in dry bulk density the data for soil penetrability suggest that compaction from padding and traffic was sufficient to impede penetrability in slightly moist soil.

Tests on artifact loss and transport indicate that artifact movement from traffic may be less than expected. However, the transport and loss of exposed artifacts in locations near the pad was unexpectedly high. This is probably due to concentrated flow and to increased runoff from the road surface. Tests on damage to glass shards indicate that substantial damage can be caused by both vehicle traffic and foot traffic.

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